Machine and Tool BLUE BOOK

A DIGEST OF THE METAL WORKING INDUSTRY

JANUARY 1948

THIS MONTH

Cams: Their Use and Design

Machining External, Internal Splines

Compressed Air Speeds Production

What's Happened to Women War Workers?

Clamps, Supports for Drill Jigs

A gilable Literature

What's New in Metalworking

Advertisers' Products Index

Index to Advertisers

COMPLETE INDEX ON PAGE 5

A HITCHCOCK PUBLICATION



cutting off test specimens in the Metallurgical Laboratory of this giant steel plant. There is no time for pampering here. Each saw must handle anything that comes, as it comes—the hardest steels and toughest alloys. comes—the narcest steels and toughest alloys, in all degrees of hardness—in any size, any form or condition—because each heat, each drawing, and each forming run has to be

The steel mill where these pictures were taken reports that these saws have been operating 24 hours, 7 days a week for the last five years. Maintenance cost has been practically non-existent. Furthermore, the effi-ciency of these saws has made possible the elimination of an equal number of other sawing machines in the department.

The answer to your cut-off problem, whether large or small, will be found in our new C48 catalog. The services of our field engineers are also available in every locality. Send for either or both now.













ARMSTRONG-BLUM MFG. "The Hock Sow People"

5700 BLOOMINGDALE AVENUE

CHICAGO 39, U. S. A.

Let this new HUBAKI catalog be your guide in choosing the arc welder that's right for your work

You should have this new Hobart Arc Welder Catalog on file at all times if you're really interested in increasing production and cutting costs. Complete with illustrations and detailed specifications, you'll find this catalog contains an arc welder for every arc welding application. It points out Hobart's exclusive features and advantages, so you can compare values before you buy. It will show you how Hobart's advance design and sound engineering make them the fastest selling welders on the market today. Return coupon for your FREE



1. Industrial AC



copy! Hobart Bros. Co., Box TB-18 Troy, Ohio.

2. Gasoline Drive



3. Gas Drive



- Waldmahile



5. Build Your Own



6. & Power Unit



7. Type AC



1000		251
	111111	1111
	1000	downort
a the most	dis lorgest buil	ders of
ind of the wor	arcv	velders"

Try HOBART electrodes next time, You'll like them bester.

1	HODADT	BROTHERS	CON	IPANY,	BOX TI	3-1811	wi,
(SP)	HODAIL	DICOTT		Idea	corresp	onding	to n
	Please se	nd details o	n the	Melder	Collect	4	7

I've circled. 1. 2. 3. 4. 5.

NAME.

FIRM_

ADDRESS_

Send Welder Catalog

Send Electrode Catalog

RIVETT

MACHINES

FOR TOOLROOM AND PRODUCTION

PRECISION CABINET LATHES. Used for turning operations without power feed. Many attachments extend work range.

Two sizes: Series 715 with 7" swing, 15" centers. Series 918S with 9" swing, 18" centers.

PRECISION TURRET LATHE. Produces small and medium-sized parts from bar stock or on second operations. Series 918S with 9" swing, infinite spindle speeds to 4,000 r.p.m., stationary collets up to $\frac{7}{8}$ " dia. or draw-in collets up to $\frac{1}{8}$ " dia.

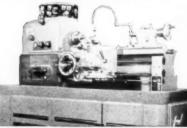
PRECISION TOOLROOM GRINDERS. Suitable for die and tool making as well as precision manufacturing. For both internal and external grinding.

Three sizes: Series 104 for work up to 3" dia. Series 112 for work up to 8" dia. Series 1024 for internal up to 9" dia., external up to 12" dia.

PRECISION TOOLROOM LATHES. For finest metal turning in any toolroom, experimental shop or laboratory.

Two sizes: Series 608 with 8½" swing, 18" centers. Series 1020R with 12½" swing, 24" centers.

Write for descriptive literature.



RIVETT LATHE & GRINDER

INCORPORATED

BRIGHTON . BOSTON . MASS. . U.S.A.



INCORPORATED

14 Grafton Street WORCESTER 8, MASS

GROUND THREAD TAPS . PLUG AND RING THREAD GAGES . INTERNAL MICROMETERS

ARMSTRONG



ARMSTRONG TOOL HOLDERS give the lowest possible tool cost

The more operations you tool with ARMSTRONG TOOL HOLDERS, the greater your savings and profits. These permanent multi-purpose tools are low in initial cost. They give years of continuous service, reducing the direct tool cost per job to a matter of cents. Using small cutters or bits quickly ground from stock shapes, they "Save: All Forging, 70% Grinding and 90% High Speed."

But greater still than these substantial direct savings are the indirect savings these tools effect. They reduce "tooling-up" to a matter of minutes—end costly delays and keep men and machines producing. Strong and efficient, they permit higher speeds and heavy feeds—machine more pieces per machine hour, machine more accurately reducing losses through rejects or spoilage.

Use ARMSTRONG TOOL HOLDERS for every operation on lathes, planers, slotters and shapers, on turret lathes and screw machines, to cut costs and increase profits.

Write for Bulletins on-

- (a) ARMSTRONG Carbide Tool Holders and ARMIDE Carbide Cutters
- (b) ARMSTRONG CA tool Holders and ARMALOY Cast Alloy Cutters

ARMSTRONG TOOLS ARE STOCKED BY INDUSTRIAL DISTRIBUTORS WRITE FOR CATALOG.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 W. Armstrong Ave.

Chicago 30, U.S.A.

Eastern Whse. & Sales: 199 Lafayette St., N. Y. 12, N. Y.

Pacific Coast Whse. & Sales Office: 1275 Mission St., San Francisco 3, Calif.



Machine and Tool

Published Monthly

Volume 44, No. 1

BLUE BOOK

William	F.	Schleicher
Editor		

C. M. Feeney Department Editor

H. L. Purdy New Equipment Editor

R. C. Van Kampen President

J. E. Hitchcock Vice President

M. L. Yonts Secretary

Vincent C. Hogren Business Manager

Robert R. Hadley Art Director

C.	E.	Elzinga	
	Circ	culation	Manager

IANUARY, 1948

•
Featured in this issue
As the Editor Sees it127
Cams—Their Production and Application
Machine Shops Save Time and Labor with Fork-Lift Trucks
Accurate Machining of External and Internal
Straight-sided Splines
Compressed Air and Pneumatic Tools Speed Production 158 By D. H. Palmer
Work Clamps, Supports and Fastenings for use with Drill Jigs
What Has Happened to Women War Workers?187 By C. M. Feeney
Letter from England
News of the Industry211
Appointments and Promotions218
Available Literature225
This Month's Industrial Films231
New Technical Books235
What's New in Metalworking239
Mechanics Through the Ages340
Products Index342
Index to Advertisers350

CCA

District Managers

New England and N. Y. State: W. E. Hoffman, Portland, Conn., Phone 2946
New York, Metropolitan Area: A. E. Wailes, 55 W. 42nd St., New York 18, N. Y.
Phone Lackawanna 4-4528

Pennsylvania and South Atlantic States: E. A. Dunhom, 6488 Lawnton Street, Philadelphia 28, Pa., Tel. Roxboro 8-1189-J

Michigan: John A. Wright, 8630 W. Outer Dr., Detroit, Mich., Tel. Kenwood 2-6140 Ohio, Indiana, Kentucky: H. J. Smith, 6130 Webbland Place, Pleasant Ridge, Cincinnati 13, Ohio, JEfferson 6606

Middle West: James C. Stewart, Otto Highfield, 542 S. Dearborn St., Chicago 5, Ill.

Pacific Coast: R. H. Deibler, 2506 W. 8th St., Los Angeles 5, Callf. Phone
Federal 0303

In U.S.A.—1 Year \$3.50—2 Years \$6.00—3 Years—\$9.00 Canadian and Foreign—\$4.50 per Year

Publisher reserves the right to reject any subscription which does not conform to his measure of buying power coverage.

(Copyright 1948, by Hitchcock Publishing Co., Chicago 5, Ill.)

Phone: HARrison 6040

Cable Address: HITCHPUB



MAIL COUPON FOR FREE SAMPLE

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 1BB, 1928 West 46th St., Chicago 9, III.

Without obligation, please send us a free sample kit of one tube of CMD Center Point Lube and one tube of CMD Center Point Oil. Also, send Catalog describing CMD Helical Groove Centers.

FIRM NAME......ADDRESS.....

FASTER PRECISION HONING...

FULMER HONING

THE Fulmer Honing Machine produces round, straight, smooth bores to working tolerances as close as ±.0001".

Due to a wide range of spindle and reciprocating speeds, it removes material faster than any other known method for a comparable degree of accuracy and surface finish.

It is ideal for finishing aircraft, Diesel, gas and compressor cylinders; connecting rods; supercharger parts; landing gear struts; recoil cylinders—wherever superfine surfaces and extreme accuracy are required.

Cylinders of either small or large diameter can be honed on the Fulmer Honing Machine. Standard honing capacity is up to 20" inside diameter. Larger capacity on special order. Maximum stroke 72". Any conventional honing heads can be used. Write for complete information.

C. ALLEN FULMER COMPANY
1233 First National Bank Bldg., Cincinnati, Ohio





● CINCINNATI FEEDMATIC Hoppers eliminate all manual feeding operations and thus greatly increase production of Infeed and Thrufeed grinding operations on CINCINNATI Centerless Grinding Machines. ¶Type B FEEDMATIC Hopper, for Infeed grinding, handles headed work up to 8" in length under the head, such as studs, chain pins, valve tappets. Type E FEEDMATIC Hopper handles all types of Thrufeed work including parts requiring a very high finish, such as piston pins, small shafts, bushings and similar work from ¼" to 1½" diameter, and twice the diameter up to 18" in length. ¶One man can operate more than one machine because the operator simply keeps the hopper full, and grinding is continuous. ¶For long runs of Infeed or Thrufeed arinding, you'll find it profitable to use CINCINNATI FEEDMATIC Hoppers. Complete details will be sent on request.

FEEDMATIC HOPPERS FULL

and centerless grinding is continuous!





Close-up showing the bin and chain conveyor of a type E Hopper.

> The machines in a line of CINCINNATI FILM-ATIC No. 2 Centerless Grinders, with type E Hopper and special conveyor for continuous grinding.

See the
CINCINNATI GRINDERS DISPLAY
at the MACHINE TOOL SHOW.

Booth No. 306 Chicago, Sept. 17-26

CINCINNATI GRINDERS INCORPORATED

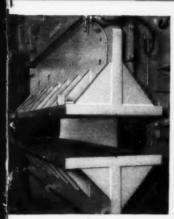
CINCINNATI . OHIO. U.S.A.

CENTER TYPE GRINDING MACHINES . CENTERLESS GRINDING MACHINES . CENTERLESS LAPPING MACHINES

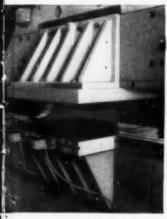
When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

0



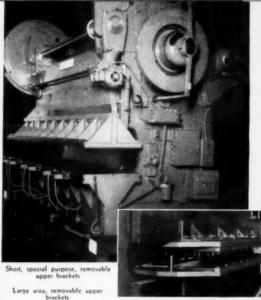


Large area, permanent wide bed and ram for press work



Large area, removable upper and lower brackets





JUMBO DIE AREAS.

on CINCINNATI PRESS BRAKES

With Cincinnati wide rams and beds, Cincinnati Press Brakes are now being used for both PRESS and PRESS BRAKE work.

These wide rams and beds are of two basic types—the permanent type for Press work only; the removable bracket type for general purpose requirements. With removable brackets, Cincinnati Press Brakes are dual purpose and function as Presses but also retain all the versatility of a Press Brake.

Both removable and permanent types of wide rams and beds are furnished in dimensions and areas to fit your particular requirements. We illustrate some of the combinations available.

Investigate!! Our Engineering Department will be glad to advise you on the profit and production possibilities of this new development in your shop. Write for Catalog B-2.

THE CINCINNATI SHAPER CO.

CINCINNATI 25. OHIO U.S.A. SHAPERS SHEARS BRAKES

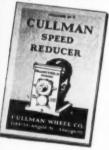
HERE'S HOW...

TO GET MORE PRODUCTION FROM EXISTING MACHINES

CULLMAN Speed REDUCERS

ADAPT ELECTRIC MOTORS TO SLOWER OPERATIONS

New Low-speed Range For Motors 1/4 To 15 h. p Fit Speeds To Job Needs





Get the facts! Ask for this helpful booklet which contains much useful data and facts for buyers. It describes Cullman Speed Reducers and other Cullman products.

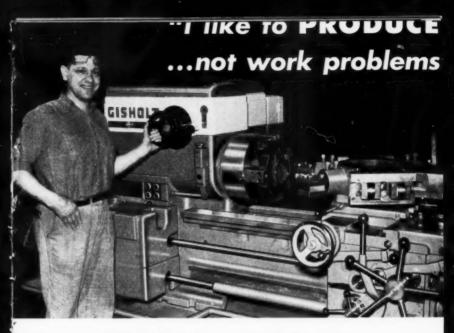


Any standard electric motor can be adapted for many new uses by adding a Cullman Speed Reducer. Compact, dependable, efficient—Cullman Speed Reducers are made in single and double reduction types. Cullman units are equipped with Helical Gears, Roller Bearings, Sprockets and Roller Chains all operating in oil. Installation is simplified by convenient motor mountings.

CULLMAN WHEEL COMPANY

1350-W Altgeld Street

Chicago 14, Illinois



the GISHOLT Speed Selector does the figuring!

No wonder turret lathe operators like the Gisholt Speed Selector. Without it, here is what they have to do to get the proper spindle speed:

- Take the diameter to be cut and multiply it by 3.1416 to get the circumference.
- Refer to tables to get the proper cutting speed in feet per minute for the material, based upon depth of cut, tooling and feed.
- Divide cutting speed by circumference at cutting point to figure the proper spindle r.p.m.
- Get the spindle revolving at that speed by means of manual control.

All this the Gisholt Speed Selector eliminates. The operator merely turns the hand wheel to the diameter of the cut. The machine automatically responds with the proper spindle speed.

Nobody wants to do it the hard way any more. That's why the Speed Selector is now standard equipment on Gisholt Turret Lathes.

GISHOLT MACHINE COMPANY

Madison 3. Wisconsin

THE HYDRAULIC SPEED SELECTOR, now standar Gisholt Turret Lathes, is another important imp ment in the interests of greater production and machining costs. Ask for complete information.



represents the colle

experience of spe ists in the ma ing, surface ishing andba ing of round semi-round p Your problem welcomed here.

TURRET LATHES . AUTOMATIC LATHES . SUPERFINISHERS . BALANCERS . SPECIAL MACHI



TUMICO Tubular Micrometers Quickly and Easily Gage Work Diameters to 96"

Light Tubular Structure
Cuts Operator's Fatigue in Gaging Large Turned Diameters—"Feather-Touch" Feel Insures Precision
Measurements.

Precision gaging of work diameters to 96" is both practical and possible with Tumico Tubular Micrometers. Because these micrometers are light in weight, accurate measurements are easily and quickly made on large diameters without tiring the operator. "feather-touch" feel insures precision gaging impossible with heavy solid frame micrometers or calipers. Tumico instruments are designed to reduce measuring time on all types of close work.

MORE TIME SAVING-PROFIT PRODUCING TUMICO PRODUCTS FOR YOUR NEEDS.



1. Tumico Tubular steel dejustable Limit 1 Snap Gages are up to 50% lighter in weight than solid type units and offer unequalled "feather-touch" feel and balance.



2. Tumico Tubular Micrometers feature "feather-touch" feel for making repetitive precision measurements. They are

Series T fixed anvil type in size 0" to 96" and in Series M mandrel type in size 0" to 96" or 106" both in sets or combination. Embodied in these micrometers are such important structural features as hardened and ground spindles, ground and lapped spindle threads, special alloy steel vacuum sealed frames, triple plated with copper, nickel and chrome and easy to read numerals.



3. Tumice Pocket Slide Calipers accur a tely measure both outside and inside diameters. Deep, clear, calibrations in 32nds and 64ths with latter numbered for rapid reading make these desirable for precision work. Readings in English ar metric.

Write Today

—for further information about Tumico Precision Measuring Instruments for all standard and special requirements.





4. Tumico Thrift Micrometers are economically priced units having drop forge steel frames, hardened anvils and spindle tips. They are available with ratchet stop and lock

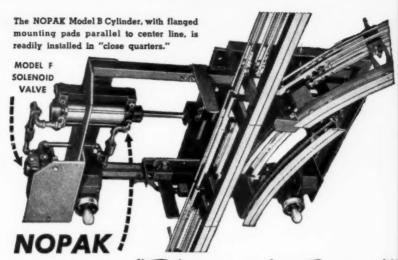
ring, or Vernier scale in size 0" to 6".

ROMETER CO.

TUBULAR MICROMETER CO.

ST. JAMES, MINNESOTA, U.S.A. MILWAUKEE BRANCH
PLANKINTON BLDG.

m man



Cylinder "Throws the Switch" in AMERICAN MONORAIL SYSTEMS

These overhead systems are noted for fine engineering, sturdy construction, smooth operation. The NOPAK Model "B" Air Cylinder throws the switch which permits the Monorail carrier to go from the main rail to either of two spurs. Self-regulating cushion action assures fast positioning of rail segments without jarring switch frame. Cylinder is actuated by a NOPAK %" Model "F" Solenoid Valve.

American Monorail's satisfaction is expressed as follows: — "This cylinder, because of its compactness, mounts very nicely in the switch frame, and has more than sufficient power to throw the switch with its precision stroke." You, too, will find NOPAK Valves and Cylinders adequately suited to your design and operating needs.

GALLAND-HENNING MFG. CO., 2754 S. 31st Street, Milwaukee 7, Wis.

Write for Illustrated Bulletin No. 92

Representatives in Principal Cities



STOP DUSTS

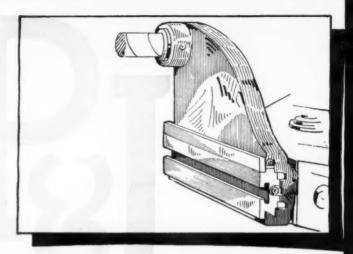
Dustkop Vapor Collectors stop mist and vapor from thread grinders, screw machines with the same low cost efficiency that Dustkop Dust Collectors stop dust and lint from grinding, polishing and buffing. They save heat. They also reduce colds.

With Low Cost Individual DUSTKOPS



Send For Catalog A-415 Now.

ANN ARBOR, MICHIGAN



SLIDE TOOL . . . with Overhead Pilot

This versatile, horizontal Slide Tool is designed for use with a considerable number of Potter & Johnston Machines.

For heavy facing cuts, several cutter blocks may be held in the Slide, which is fed either to the rear or to the front of the machine by a pusher attached to the Machine Cross Slide. This sturdy fixture is of ample proportions and its rigidity is multiplied by the Pilot bar, allowing accurate and rapid stock removal from the work pieces. It is made with T-Slot on Center and Off Center.

This versatile tool is but one of man speedy, efficient production tools comprising the Potter Johnston line. It will pay you to invest gate these profit producing tools.

Post-war competition will demand modern tooling in the battle to reduce production costs. This helpful catalog will give you many constructive suggestions for increasing production and cutting costs. If you use Potter & Johnston machines, it will pay you to write for a copy—no obligation.





When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



GRIPPING FORCE 15 TIMES AIR LINE PRESSURE

Speedy Air Vise helps you do dozens of operations faster, better, cheaperby air pressure! Foot control valve opens and shuts vise instantly, leaving both hands free to produce more! Jaw opens up to 3 inches, holds castings, parts, jigs, etc. Compact, trouble-free, inexpensive. Complete with Foot Control Valve, Air Hose and Fittings . . only \$29.90

ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT



Precision - built. Delivers pressures up to 140 lbs. With gauge, \$4.95 Less gauge. \$3.10



Keeps water and particles out of the regulator and pneumatic tools. \$1.85

BLOW-GUN

Looks and operates like a gun. Ideal for cleaning and blowing out chips, dust, filings, scraps, etc. . \$3.00



W. R. BROWN CORP. . 5720 ARMITAGE AVE. . CHICAGO 39, ILL.

PROVEN PERFORMANCE SELLS 6 OUT OF 10 GRAND RAPIDS GRIN

Of every ten Grand Rapids Hydraulic Feed Surface Grinders sold, six are to customers already using Gallmeyer and Livingston grinding machinery.

Such customer acceptance and approval is proof of the quality of Grand Rapids Grinders.

FEATURES

- 125 feet per minute longit table speed
- Separate motors to drive gri wheel spindle and hydraulic
- Two spindle speeds to reduce v
- Portable, self-contained motor en coolant system
- Vickers vane type hydraulic po Starters, controls and motors ea
- Special G & L spindle motor e bells and over-size precision b bearings

SPECIFICATIONS

Automatic table travel-long tudinal 38", transverse 131/2"

Working surface of tabl -12" x 36" • Standard wheel size-

12" x 1" x 3" Vertical movement of wheel head-18". Spindle speeds-1925 and 2500 RPM • Floor

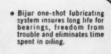
space-150" wide x 102" deep

Write for Bulletin GL 101



Patented vertical adjustment of wheel head. The large hand wheel is graduated in thousandths, the small one in tenths of thousandths.

· Heavy, rugged, onepiece column and base of very closegrained gray iron, castinourownfoundry assures permanent alignment between cross travel ways and vertical head ways.





GRIND PAPIDS

GALLMEYER & LIVINGSTON COMPANY, 405 STRAIGHT ST., S.W., GRAND RAPIDS 4,

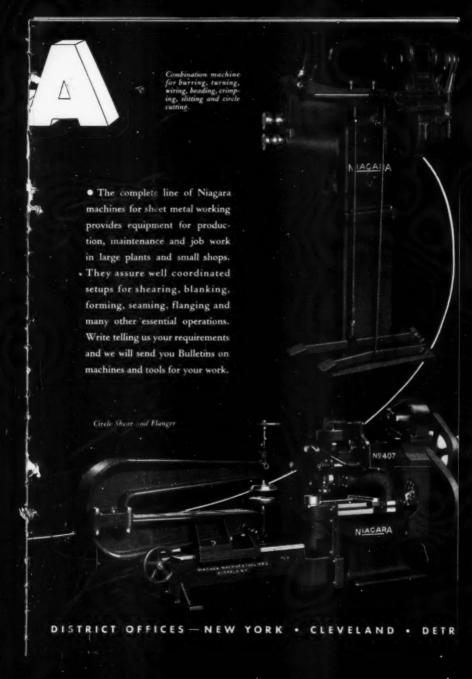
MIAGA.

RESSES, SHEARS, MACHINES and tools for plate and sheet metal work

Slip Roll Former

Double Seamer

GARA MACHINE & TOOL WORKS, BUFFALO 11, NEW YORK



The SUPER METHOD



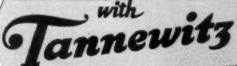
f TRIMMING FORMED PARTS

and performing a host of
other metal cutting jobs!

he negligible down-drag and the ability of annewitz High Speed Band Saws to cut heet metal from 90° to near 0 or 135° at emendous speed make these machines ideal or trimming. Cuts can be made with perfect afety without using a rest of any kind.

riction sawing with Tannewitz High Speed Sand Saws also results in perfectly mazing time savings in the cutting f flat sheets, soft or hardened teels, armor plate, plastics, glass nd many other materials. Whatever your utting problem, chances are it can be done etter and faster with Tannewitz Band Saws. nvestigate this "Super" method of cutting.





Write for Your

HIGH SPEED BAND SAWS

THE TANNEWITZ WORKS 4, MICHIGAN

MACHINE and TOOL BLUE BOOK

January, 1948



Hoot Mon— I really Save with these KEMPSMITH Attachments....

KEMPSMITH

and accessories are available in all popular sizes and types. Adaptable to any make of milling machine with standardized apindle. Write for Arbor Bulletin. ◆ Yes sir — a small investment in KEMP-SMITH Standard Attachments enables you to reduce production milling costs to rock bottom . . . gives you extra profits from a variety of precision jobs such as rack milling, jig boring, oil grooving, die sinking, tang slot milling, etc.

Kempsmith Standard Attachments broaden the scope of your milling machines. Backed by more than a half century of specialized experience building milling machines exclusively, these precision-built attachments result in (1) lower capital investment in machinery (2) saving in set-up time and (3) greater job versatility. Write today for literature.

Smell Tool Distributors. There is a great demand for Kempsmith Standard Attachments, Arbors and Accessories. Desirable territory still available. Write today for new, liberal selling plan.

KEMPSMITH MACHINE COMPANY

1827 SOUTH 71ST STREET MILWAUKEE 14, WISCONSIN, U.S.A.





(EMPSAME)

Precision Built Milling Machines Since 1888

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

SELECT the PRESS YOU NEED

Dake Arbor Presses are available in a wide variety of sizes and capacities, so it's easy to pick the one best fitted to your job. Bench models are as small as one ton, while larger units provide electrically operated pressures up to 75 tons. In between there is a wide range to meet every manufacturing problem.

Dake presses are carefully designed for long life and convenient operation.

Write for the new Dake catalog which describes the complete range of sizes.

MAIL

Dake Engine Company 608 Seventh St. Grand Haven, Mich.

Please send me a copy of the latest Dake Arbor Press Catalog.

Name.....

Company.....

Address -



Left to right, top to bottom are shown the 10-ton Utility, 75-ton Elec-draulic, 70 and 25-ton hydraulic, 12-ton combination, and one-ton presses. Other sizes available.

DAKE
ENGINE COMPANY
GRAND HAVEN, MICHIGAN

Let MEAD'S STEEL-FINGERED GIANTS

DO THAT JOB

Faster, Better, Cheaper



Besides the standard, ready-made fix-tures for the application of Air Power, (such as the Air Press, Air Vise, Air Chuck, Air Clamp) Mead offers a wide selection of air cylinders which can be used in special jigs and fixtures. Illus-trations show four types of double-acting cylinders which can be furnished in five different bores with optional length of

Use MEAD AIR POWER

Get faster, more economical production set-ups-investigate the entire "family" of Mead Air - Operated devices. Do you want

to move things-lift them, slide them, tilt them-or hold them firmly? Mead Air Power will do it. Do you need a delicate flexible touch-or tremendous power? Mead Air Power has both.

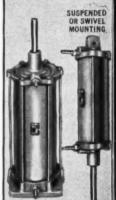
CATALOG READY

Send for copy of our new Air Power Catalog illustrating, describing many new manand-money-saving devices.





HORIZONTAL MOUNTING

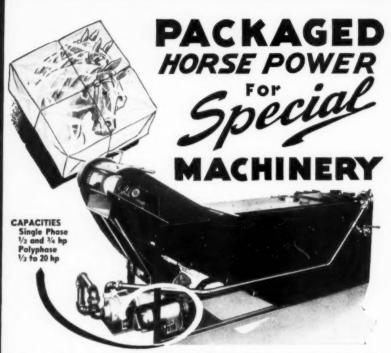


VERTICAL MOUNTING



Dept. YA-18 Chicago 41, III. 4114 North Knox Avenue





American Gas Furnace Company of Elizabeth, N. J., manufacturers of Special Quench Tanks as shown above chose LIMA multi-speed Gearshift Drives because of LIMA'S Reliable Performance Records.

Performance records of original equipment can be only as good as the component parts which are incorporated into the finished product. This is why so many manufacturers of Original Equipment choose LIMA multispeed Gearshift Drives.

Let LIMA Engineers make a survey of your Drive requirements. There is no charge for this service.



THE LIMA ELECTRIC MOTOR CO.

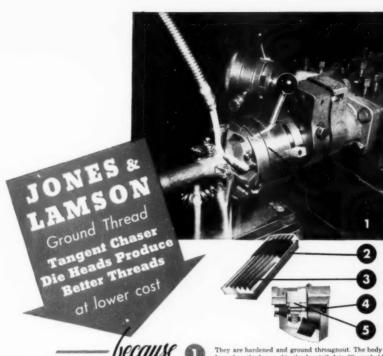
266 Findlay Road

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES





pecause

They are hardened and ground throughout. The body is lapped on the face and in the dovetail slots. Chaser holder bearing surfaces are lapped into the body.

Chasers are guaranteed to produce threads of Class III fit.

Exact helix angle is ground into the chasers after hardening.

With a single set of chaser holders, any thread, within the rated capacity of the holders can be cut, regardless of helix angle, eliminating the expense and trouble of constantly changing holders for different helix angles.

Chasers are set quickly and easily.

If you are interested in greater economy and better quality in threading, write to us (Department 710) for complete information about our Die Heads.

ones & Lamson AVAILABLE IN STATIONARY & REVOLVING TYPES TANGENT DIE HEADS



JONES & LAMSON MACHINE COMPANY Springfield, Vermont, U. S. A.

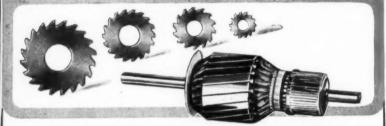
Manufacturer of Universal Turret Lathes Fay Automatic Lathen - Automatic Double-End Milling and Centering Machines - Automatic Thread Granders - Optical Comparators - Automatic Opening Threading Dies and Cheeses - Ground Thread Flat Rolling Dies

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

CIRCLE®

Solid Tungsten Carbide

COMMUTATOR SLOTTING SAWS



INCREASE PRODUCTION

25 to 80 TIMES over High Speed Steel Saws

Commutator slotting saws are made in diameters from %" to 1%", and from .010" to .045" thick. They operate at 5,000 to 6,000 R.P.M. and assure better work at these greater speeds! Complete price information available on request.

CIRCULAR TOOL CO., INC.

PROVIDENCE S. P. L.

CHICAGO . PHILADELPHIA . NEW YORK . DAYTON . CLEVELAND . DETROI

8" Diam. SAE 4620 steel forged rear axle drive gear blank.

Acme-Gridley 12" Single Spindle Chuck-More tooled for first operation on rest axle 4---

1ST OPERATION— Taper face, counterbore and face bottom. Machine Time: 43 accords. 2ND OPERATION— Face, form angle, rough and finish bore. Machine Time: 60

Nach Control of the C

CHUCK-MATIC PRODUCTION

Two Operations—1 Min. 43 Sec.—Complete

For accurate, high-speed production of chucking jobs take a tip from this typical case study—one of many we can show on the new Acme-Gridley 12" Chuck-Matic. It's built rugged—and powerful—to deliver speeds and feeds as fast as carbidetipped tools can take it.

It's built for high production—with a minimum of idle movement and plenty of accessibility for quick setups, easy loading, easy adjustment.

> It's built compact—for space saving. And because it's easy to operate, one operator (he needn't be highly skilled, either) can run as many as four machines.

That's why we think you'll be interested in the complete details on the Chuck-Matic. Ask for bulletin SC-46.

The NATIONAL ACME CO.

Acmo-Gridisy Bar and Checking Automatics:
1-6-5 and 8 Spindly - Rydrault Thread
19-6 threading Bioand Tags. The Chronology. Limit. Mater Starter
and Cautrol Station Switcher
Control Switcher
Contr

3" HUSKY VISE

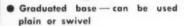


MILLING MACHINE - SHAPER DRILL PRESS - GRINDER



THEY'RE STRONG WE

MEAN



- Width of Jaws 3"
- Depth of Jaws 1"
- Opens with steel jaws 2" (hardened)
- Weight complete with crank 16 lbs.



- Large Acme steel screw contributes sturdiness and durability
- Four bolt and key slots are provided to attach the vise rigidly to the machine table so that work holding surfaces are at true right angles to the table.

Our modern production facilities enable us to produce hi-quality machine tool equipment at the lowest prices.

ORDER TODAY

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

23 SO. ST. CLAIR ST. TOLEDO 4, OHIO



TOOL AND CUTTER
GRINDER

IT'S FASTER --MORE ACCURATE

The Oliver Ace keeps production cutters in tip-top condition at greatly lowered costs—It's simple to set up and physically easy to operate. Saves setting up time—Only two fixtures are needed to grind all standard type cutters. Work is always in direct view of the operator—No Stoop, No Squat, No Squint.

The ACE sharpens a cutter in the same time it takes to make ready on the average machine—Clearances are obtained by direct reading—Äny combination of angles can be quickly and easily obtained—



THE HEAVY DUTY MODEL WAS DESIGNED TO CARE FOR YOUR TUNGSTEN CARBIDE CUTTER GRINDING. "IT'S TOPS."

Send for Illustrated Bulletin

IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

OLIVER INSTRUMENT CO.

1408 E. MAUMEE ST.

ADRIAN, MICH.



AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

HUGE DEMAND AND VOLUME PRODUCTION PERMIT

REDUCED PRICES!



LONGER SERVICE COSTS YOU LESS THAN EVER!

NEW LOW PRICES. Increased production to meet the heavy demand for Herman Granite Precision Surface Plates now makes important price reductions possible. You can realize particularly important savings on the larger sizes. Where like tolerances are quoted, you'll find Herman Surface Plates cost less than cast iron plates in many instances. And you save through service, since a Herman Granite Surface Plate will outwer ten ordinary plates.

ACCURACY. Herman Granite Precision Surface Plates are made in a variety of sizes and tolerances. Unaffected by ordinary temparatures. Rust-proof, warp-proof, corrosion-proof. **EFFICIENCY.** Hard smooth surface makes work go faster. Herman Surface Plates are non-magnetic, non-abrasive, easy to keep clean. Made to meet every type of exacting requirements for tool-room, production and inspection operations.

ECONOMY. Herman Surface Plates are practically indestructible. You save an 'Joe Blocks', height gauges and other tools. Harder than any tools that are used on them.

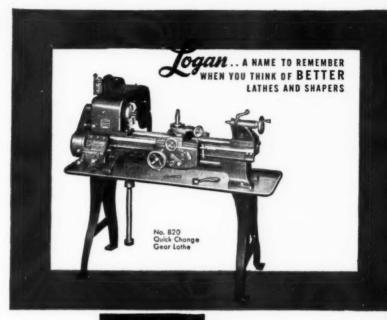
FREE TEST IN YOUR SHOP!

Make your own practical shop test with a Herman Granite Precision Surface Plate — free! Simply mail your request for a specific test date to The Herman Stone Company.

Write Dept. 11 For Complete Information And Prices

The Herman Stone Co.

324 Harries Building, Dayton 2, Ohio



LASTING ACCURACY

Another Reason Why More Industries Every Year Use Logan Lathes



The ability of the Logan Lathe to work to closest tolerances after years of usage results from advanced design and precise construction methods. The Logan ball bearing mounted spindle, for example, constant in its accuracy through all speed ranges and under all operating conditions. Headstock bearing faces are held to an accuracy of .0005". Total spindle run-out 12 inches from the bearing is less that .0008". Bed ways are within .0005" of parallelism. Rugged, massive construction is combined with these precision standards. Vital poin of the lathe are protected by self-lubricating bronze bearings. It this careful building that gives the Logan Lathe its lasting accuracy Full information on Logan Lathes and Shapers on request.

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . swing over be $10\frac{1}{2}$ " . . . bed length, $43\frac{1}{6}$ " . . size of hole through spindle, 25/32" . . spind nose diameter and threads per inch, $1\frac{1}{2}$ " — 8 . . . 12 spindle speeds, 30 to 145 rpm . . motor, $\frac{1}{2}$ hp, 1750 rpm . . boll bearing spindle mounting . . drum typ reversing motor switch and cord . . . precision-ground ways, 2 V-ways and 2 flat way

DISTRICT OFFICES:

Woolworth Bldg. New York 7, N. Y Cortland 7-8024 550 W. Washington Blvd. Chicago 6, Illinois Central 1246 1672 Mission Street San Francisco, Calif Underhill 6682

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOI

ere are the 1810 features production men like



ir base design offers maximum acsibility to hinged guard for wheel nge. Note ramped outlet for easy Ige removal.



Steel ribbon type guards provide complete protection of base ways and reduce grit infiltration. Neat and compact, they require no extra floor space, and allow a more rigid table design.



ctrical equipment servicing made y. Major controls located in elevated, essible cabinet. Note rigid conduit.



Pumps and motors mounted outside base to insure convenience and minimum time consumption in maintenance and service.

...in the Norton Type CTU CYLINDRICAL GRINDERS

INE all around service — whether on high production, or on job lot runs — is delivered by the new NORTON type CTU 6" and 10" Cylindrical Grinding Machines.

They have increased rigidity through new features in design. This rigidity fortifies their unique ability to stand up under heavy service. It also prolongs the fine quality of precision they offer.

Easy loading, the many new features described on the opposite page, plus new flexibility and the scientific positioning of controls, all make for greater operating ease, and for the very important factors of low work and maintenance costs.

NORTON 6" and 10" Type CTU machines are made in plain and semiautomatic arrangements — write for catalog.

NORTON COMPANY, WORCESTER 6, MASS.

New York - Chicago - Detroit - Cleveland - Hartford
Distributors in All Principal Cities

NORTON OF THE PARTY OF THE PART

The NORTON 10" x 36" Type CTU Semisutometic Cylindrical Grinde

NORTON GRINDERS



SOUPPLE HOLDER SOLE HOLDERS IN ONE!

NEEDS THIS TOOL!

dies. Straigh d button 1/2" cap

• Straight shank will fit any 1/2" capacity chuck.

Jobbers: Profitable territories still open. Write today!

ATHE ACCESSORY

ORDER FROM YOUR JOBBER TODAY!

OR WRITE TO-BEVERLY BLACKSMITH, BOX NO 262 AURORA, ILLINOIS

TOOLS FOR EVERY SHOP!



TYPE 2BDG belt drive 1 H.P. to 15 H.P. Longer wheel life, lower wheel costs, higher production!



TYPE BAS 1/4 H.P. to 1 H.P. Ball bearing equipped, adjustable to wheel wear!



TYPE BPA 1/4 H.P. to 10 H.P. A 2-in-1 precision tool. Grind externally, and in a few minutes mount an interchangeable quill for internal grind-ing up to 24" deep!



TYPE CA 1/4 H.P. to 1/2 H.P. Particularly adapted for grinding lathe centers, cutters, reamers, dies, rolls and various work on lathes, milling ma-chine, shaper, planer or boring mill!

Manufacturers of STANDARD: Grinders, Tool Post, Internal, Disc, Carbide, Vertical Spindle, Snagging, etc. V₄ H.P. to 50 H.P. Buffing and Polishing Machines up to 60 H.P. **Speed Lathes.**

WRITE FOR CATALOG TODAY





STANDARD SIZES OF UNIVERSAL JOINTS FROM 4" TO 3/8" DIAMETER

offering modern industry a real advantage in having universal joints, of the highest quality, available for immediate shipment.

CURTIS

STOCKS

This wide range of sizes — with either solid or bored hubs — fits most universal joint needs — from instrument controls to heavy duty steel mill applications.

Curtis makes universal joints exclusively and their 25 years experience is yours to command. Special machining for specific applications is done before assembly — saving money and insuring accuracy.

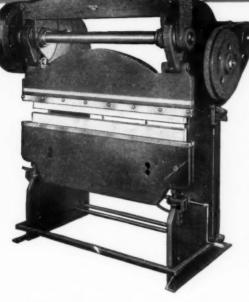
Send us your universal joint problems, indicating assembly a specific properties and accuracy.

Send us your universal joint problems, indicating speed, angle of operation and torque load, with blueprints if possible. There is a Curtis Universal Joint immediately available to you — whether for a heavy duty 4" installation or a high-speed, light duty job.

WRITE DEPT. B-1



Powerful CHICAGO STEEL PRESS BRAKE



"300"

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

This money-saving production tool will handle 40 to 50 percent of the work done in an average shop. Greater speed, higher efficiency—much lower operating cost—plus the highest quality material and sturdy steel welded construction as in our larger machines.

-3 sizes—capacities 10 gage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by $1\frac{1}{2}$ h. p. motor.

We also build special machines for intricate bending operations.

Take advantage of our experience of over 45 years by sending to us any difficult bending problem you have.

WORLD'S LARGEST MANUFACTURER OF HAND BENDING,
POWER BENDING AND FOWER PRESS BRAKES

DREIS & KRUMP MANUFACTURING CO.

7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS
SEND FOR NEW BOOK "FORMING PRESS DIES AND THEIR USES"

Speed-wet*Discs Cut Faster...Longer



3 ways better

"30% Faster" . . . "production 4 to 1 better" . . . "lasts 5 times longer" . . . mever before have so many people expressed so much praise for any disc we ever made.

Technically, the secret of the extra cutting speed and long life of Speed-Wet Discs lies in the balanced combination of three quality features: heat-set resin bonding for resistance to heat; all-fibre backing for extreme flexural strength; and all-Durabonded* coating for rugged grit anchorage.

An on-the-job test in your own plant will prove to you the increased production performance of Speed-Wet Discs. We'll be glad to arrange it at your convenience—just write us on your company letterhead.

* Reg. U. S. Pot. Off.

watch for SERVICE PACKAGING

BEHR-MANNING

(DIVISION OF NORTON COMPANY)

TROY, N. Y.

- * All Resin Bonding
- All Fibre Backing
- * All Durabonded Coating



Now ...

your ALLEN
Industrial Distributor
can supply

"TAPPED HOLES BY THE BOXFUL"

For TIGHTER, STRONGER FASTENING of METAL PARTS

ALLENUTS

give you heat-treated CLASS 3 fit tapped threads and dimensional accuracy to match the holding power and precision qualities of famous Allen Hex-Socket Screws . . .

PLUS.. MANY EXTRA TIME AND MONEY-SAVING ADVANTAGES DESCRIBED FULLY IN BUL. N-51.

Write for your copy today. We will also send test samples of the new ALLENUT.

Allenuts of special alloy steel are presently offered in sizes from No. 4 to $\frac{3}{8}$ ", either NC or NF threads. Sizes from $\frac{7}{16}$ " to 1" available soon. Order through your Allen industrial distributor.

THE ALLENUT is mespecially for use vallen HEX-SOCI SCREWS of which it counterpart in strer and precision thread





THE ALLEN MANUFACTURING COMPANY
HARTFORD &, CONNECTICUT, U. S. A.

HEX-SOCKET SET, CAP, FLAT HEAD CAP AND SHOULDER SCREW

TURNING TURNING TOOL . . . Replaces 14 TOOLS



You can change R and L tools from right to left or vice versa in 10 seconds and it is the only tool of its kind on the market. No time, is wasted in set-up. R and L performs several simultaneous operations such as turning shoulder concentric with stock diameter; turning two diameters while drilling or reaming; turning one diameter — chamfering two corners, facing end of part along with drilling or reaming; turning and forming special shape on end of part while drilling or reaming; drilling and chamfering; pointing work concentric with diameter.

You can save in first cost as well as production by using R and L Tools.

Let us send you detailed information. Delivery from stock.

RIGHT to LEFT

RAND L TOOLS

1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.

Hordened and ground throughous Look to MODERN for accure fast, economical thread cutt Easily adjusted for three Wider threading range STERM TOOL Greater flexibility JUNE 7.1952 Made with least number of parts Quick and easy chaser ci butter friedly departs Cut blace to shoulder throad MODERN STATIONARY TYPE SELF-OPE DIE HEAD Modern Precision Tools STATIONARY SELF-OPENING Include ROTARY SELF-OPENING DIE HEADS STATIONARY COLLAPSIBLE TAPS Modern Self-Opening Die Heads thread diameters from 1/2" to 7" in standard heads, and up to 14" in COLLAPSIBLE TAPS ROTARY MODERN-MAGIC special heads . . . accurately, fast, and economically. CHUCKS AND COLLETS They are adapted to practically every thread cutting SELF-OPENING operation within their capacity. Designed for use in STUD SETTERS INSERTED BLADE FACE MILLING CUTTERS hand screw machines, turret lathes, and other ma-SOLID ADJUSTABLE chines where the die heads are used in a stationary DIE HEADS ADJUSTABLE HOLLOW position. UNIVERSAL CHASER GRINDING FIXTURES For complete inform write for Bulletin No.

MODERN TOOL WORKS

CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10. NEW YORK



FOR SPEED ACCURACY

CUTTING PRACTICALLY ANY MATERIAL

Operates at higher speed—4,400 blade feet per minute. Smoother and faster cutting. Sturdy enough for foundries and production. Accuracy to spare for tool and die work, like contour sawed cams, dies, and punches; ideal for experimental lab-ratories and pattern shops.

Single and 8-speed back-geared models for cut-ting practically any material. Clears 85'a" under the guide.

One-piece welded steel frame has tremendous strength. Wheels and blade, except at cutting point,

are entirely enclosed. Cabinet type base has sealedoff motor compartment. High safety rating.

Blade guides adjust by a single control, and with full safety, even when machine is running. Close balance and light, but strong Textolite wheels permit twice the speed of other 14" machines. Less vibration, and longer bearing life. Saws wood two to four times faster. Often pays for itself in 3 to 6 months.

SPECIFICATIONS:

Sawing Capacity: Blade to guard— $13\frac{1}{2}$ ". 27" dia. work. Guide to work table— $8\frac{5}{6}$ ". Table: Tills on Double Truncions. Size 15" $x15\frac{1}{2}$ ". Height Overall of Floor Model: 67".

Blade Widths: 3/16", 1/4", 3/4", 1/2" and 3/4". Length of Blade: 98".

Wheels: Disc. Moulded Textolite, 14" dia. |" face. Bearings: Grease-sealed Ball Bearings.

FOR A GUARANTEE OF SATISFACTORY SERVICE

specify only the products of manufacturers who SPECIALIZE in producing power

tools, rather than making them a sideline,

WRITE FOR FREE LITERATURE BOICE-CRAN

936 Central Avenue Toledo 6. Ohio

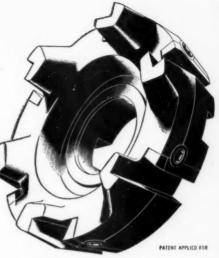
DRILL PRESSES . JIG SAWS . BELT SANDERS . LATHES . JOINTERS SAW JOINTERS . THICKNESS PLANERS . TILTING ARBOR SAWS SPINDLE SANDERS . SPINDLE SHAPERS . BAND SAWS

NOW

you can use the SAME cutter body







Once the blades are slipped in and lock screws tightened, your milling cutter is ready to go to work, as blades are furnished with all clearance angles precisionground. Blades may be re-sharpened individually on a carbide grinder and quickly reassembled in the body, or the assembled cutter may be re-sharpened in the conventional manner on a cutter grinder. Write for illustrated folder which gives complete data and prices.

The GAIRING

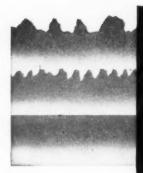
E-CON-O-MILL

A New Carbide Face Mill Made in Standard Sizes 5-inch Diameter and over

REDUCE DOWN-TIME OF YOUR MACHINES CUT DOWN YOUR TOOL INVENTORY

The Gairing Tool Company, 21228 Hoover Road, Detroit, Mich.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



Forget Surface Variations

MERZ NEW-MATICS ACCURATELY MEASURE I.D. OR O.D. . . . REGARDLESS OF SURFACE CONDITIONS

• Only Merz New-Matic Measuring Machines enable you to obtain identical I.D. or O.D. readings—every time—on parts of like diameter . . . regardless of surface variations. In Merz New-Matics, a synthetic ruby button contacts only the highest surface points. Unlike conventional gages—where compressed air directly touches all surfaces, high and low alike—Merz New-Matics are unaffected by any surface variations.

For the same reason, MERZ New-Matics are the only airactuated units capable of accurately gaging parts in which perforations or keyways have been machined. MERZ New-Matic Measuring Machines also permit accurate gaging to the extreme edges.

For full details on these and many other advantages of MERZ inspection equipment, write for free 20-page book on the *New-Matic* principle of measuring and sorting.

MERZ ENGINEERING COMPANY . INDIANAPOLIS 7, IND.

MERZ "Master" New-Matic Measuring Machine. Other models for every inspection purpose.





ENGINEERED Live Centers

GREASE SEAL

LARGE THRUST BEARING

LARGE RADIAL BEARING

CUSHION ACTION

GROUND TRUE with BEARINGS-REPLACEABLE ALLOY STEEL POINT

Standard shanks with M tapers carried in stock send us your specificat and blueprints ... we see that your job is set with the right LIVE CEN

STURDIMATIC TOOL COMPANY

5224 THIRD AVE. • DETROIT, 2 MICH.

COMPLAT SURGA



- ROK-LOK—new sensitive material clamp increases accuracy
- DOUBLE-EDGED FORMING BLADE allows close reverse bends
- NEW PRECISION STOPS accurately control angularity of bends

This versatile metal forming machine was developed for use in model shops, experimental laboratories and production departments where it often replaces dies for all types of precision forming operations. Di-Acro Brakes will form a great variety of materials including copper, bronze, stainless steel, aluminum and bi-metals.

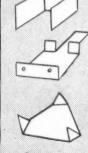
WRITE FOR CATALOG. New edition of 40-page Di-Acro Catalog contains detailed information on all Di-Acro Brakes, Shears, and Benders and illustrates how these precision machines can be used individual-

ly or cooperatively for "DIE-LESS

DUPLICATING".



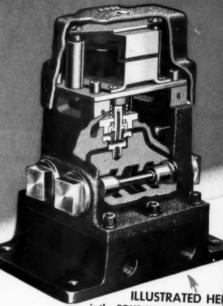
314 8TH AVE., LAKE CITY, MINNESOTA



The Wit Valve You Have Been Looking For PILOT OPERATED - SOLENOID CONTROLLE * A New ROSS Piston Poppet Type Valve

- FAST OPERATING as high as 400 cycles per minute.
- LARGE ORIFICE AREA results in fast exhaust, minimum restriction to air flow.
- POSITIVE SEAL by line pressure.
- SIMPLICITY OF DESIGN removing end plugs permits replacement of piston poppet assembly - no need to disturb piping or to move valve from position-no "down time".
- **ECONOMICAL TO OPERATE** current consumption 1.2 amps. at 110 volts-60 cycle.
- LONG SERVICE ASSURED many Ross valves installed more than 20 years ago are still in active service.
- SMALL AND COMPACT appreciated where space is limited.
- ALL PARTS non-corrosive metals.
- ACCURATELY MACHINED and all parts interchangeable.

A TYPE AND SIZE FOR EVERY PURPOSE OVER 100 DIFFERENT MODELS



is the FOUR-WAY=%" Capac

tvailable in:-

- THREE-WAY normally open, or normally closed
 - FOUR-WAY and
 - FOUR-WAY, Five po may be had in ¼", ¾", ½" and ¾" pipe

ROSS Operating VALVE CO

BRIDLE FOR AIR HORSEPOWER



Reduce the COST OF TOOLING

You can convert spindles to larger or smaller tapers - and extend the spindles in your present Drill Presses, Radial Drills, Turret Lathes, Boring Mills, etc.-to utilize their productive capacity to a greater extent.

LONGER WEAR AND BETTER PERFORMANCE

Made to exact specifications. The tang and hole ends are heat-treated for longer wear and maintenance of concentricity. They will outlast the ordinary soft sockets and perform with greater accuracy

URNISHED WITH MORSE TAPER HOLES AND SHANKS

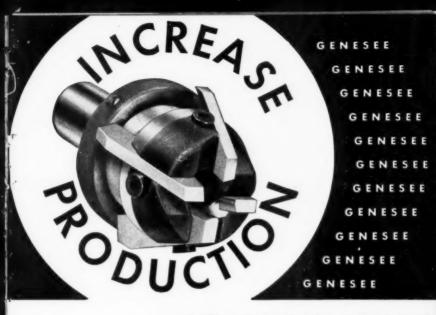
hree



For details see page 215 in Scully-Jones Manual 500

MACHINE and TOOL BLUE BOOK

January, 1948



ADJUSTABLE HOLLOW MILLS



Other Genesee tools that will increase production.

Inserted Blade FACING AND COUNTERBORING TOOLS

SPECIAL PRODUCTION
TOOLS

There is a Genesee for every hollow milling job. Available in 16 styles. Standard sizes from 0 to 2", with straight or Morse taper shanks carried in stock . . .

- Each size tool has ½ range.
- Blades quickly ground in a simple fixture.
- All tools manufactured of heat-treated alloy steel.
- · Adjusting threads are ground

from the solid and adjusting rings are lapped for extreme accuracy.

 Furnished with high speed steel, cast-alloy, or Tungsten Carbide tipped blades.

Let our Engineering Department solve your Production Tool problems.



ADJUSTABLE HOLLOW MILLS • FACING AND COUNTERBORING TOOLS • SPECIAL PRODUCTION TOOLS

MOTOR TOOL

WILL Gutlast A BASKETFUL OF Ordinary Centers

Here's Why!

You no longer have to guess whether you are overloading MOTOR TOOL Live CENTERS. When the load is too great a RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs.

This is an exclusive feature, developed by MOTOR TOOL, that cuts MOTOR TOOL Live CENTER repairs to practically nothing—immeasurably INCREASES their life—and puts an end to burnouth breakdowns and work spoilage.

Write for NEW Descriptive Folder

MOTOR TOOL MANUFACTURING CO.

METAL CUTTING TOUL

Make it a Rule to Call Motor Tool



Bridgeport MACHINES INC. BRIDGEPORT, CONN.

dials.

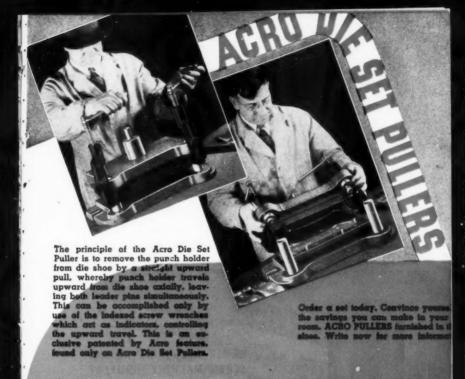
bearings throughout, keyed overarm with worm wheel control for angular settings, large diameter graduated

WRITE FOR BULLETIN



MACHINE and TOOL BLUE BOOK

January, 1948



Dual visibility — Sight gloss on side of lubricator bowl on exclusive SUPER feature, shows exact oil level maintained in hearing plus oil supply in reservoir, eliminating quoss work.

There is no drippage, no waste, no over flow. Oil is automatically fed to the bearings as required.

Nationally known authorities estimate that 75 per cont of all machinery repairs are caused by inefficient and improper lubrication, and that 85 per cont of the oil bought for lubricating purposes is never used by the bearing surface for which it was intended. WRITE FOR LITERATURE.

ACRO

PROMPT

SUPER LUBRICATOR.

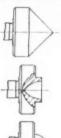


METAL STAMPING COMPANY: 332 E. RESERVOIR AVENU

ROLLER STOP and SUPPORT

The enthusiastic reception given this new Alco tool indicates that there was a great need for a combination revolving stop and support for use on screw machines. • This new tool is supplied with a rotating disc with full ball races for both thrust and radial bearings. This allows the disc to revolve at the same speed as the work and ends all friction. For clean, accurate, precision work, use the ALCO REVOLVING STOP. • The same Alco holder is used as a REVOLVING SUPPORT by easily and quickly inserting special shape inserts to fit the contour of the work end. The chief advantages of the Alco Revolving Support are the absolute rigidity which it affords on long pieces or for accurate forming, making increased feeds possible.

TO SUPPORT VARYING
SHAPES OF THE END OF
THE WORK, SPECIAL
INSERTS SUCH AS
THESE MAY BE USED.





Send for latest catalog No. 5

OTHER ALCO AIDS TO THE SCREW MACHINE INDUSTRY





RELEASING TAP HOLDER ACORN DIE HOLDER





RELEASING BUTTON DIE HOLDER DRILL CHUCK

THE ALCO TOOL CO. 252 Birdseye St., Bridgeport, Conn.



THIS IS NO FAIRY TALE. Dickerman Die Feeds are actually increasing production 300% or more in many shops. They will do the same for you, used on your present punch presses.



IN ADDITION, they reduce operator hours 80 to 90 percent, due to their accuracy, reliability, versatility. They increase die life through elimination of costly jams and crack-ups—can be attached to any press.

THESE FIGURES ARE FACTS, so why look further? Replace worn punch press feeds NOW with the new improved Dickerman Die Feeds. Send for free illustrated catalog TODAY.

H. E. DICKERMAN MFG. CO. 221-115 ALBANY STREET • SPRINGFIELD, MASS.

Announcing the New... Oinch Otlas TILT/ARBOR SAW

Precision Built for Precision Workmanship

The NEW Atlas 10-inch Tilt/Arbor floor saw is engineered and built to exacting standards . . . for easier, more accurate sawing, and greater output.

Blade alignment is permanent heavy cradle and saw arm turn on two massive trunnions that are bolted and doweled to the table. Table topis precision ground - edges are machined so extensions may be added to either side. Arbor turns on precision ball bearings. Blade tilt and height controls are easy-acting for fast setup.

Unique rip fence has two ball bearings on rear fence rail for fast, smooth positioning. Fence is self-squaring. with provision for maintaining perfect alignment - releases instantly for removal or positioning on either side of blade. Locks securely at both ends for absolute rigidity.

This new Atlas saw is built to the same precision standards as Atlas metal working tools - built for accurate, efficient production - at low cost. Ask your Atlas distributor, or send for free bulletin today.

ATLAS PRESS COMPANY

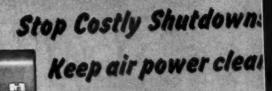
150 North Pitcher Street Kalamazoo 13D, Michigan

YOU GET ALL THIS WITH THE NEW ATLAS

271/2"x271/2" table - with 131/4" working surface ahead of blade, 191/2" to the right, 8" to left.

- Cutting depth: 31/4".
- Ball bearing rip fence. Blade tilts to 45°—locks
- rigidly at any height or Sealed, precision ball angle.
- bearings for permanent smooth operation. Dual V-belt drive.
- · Exceptional ease of
- operation. Massive construction — 262 pounds, without motor.





Norgren Filters knock out all air-borne rust, dirt and pipe scale, and eliminate oil emulsion and moisture. Air driven tools and cylinders perform better, require less maintenance and last longer. Fine mesh double Monel wire screen stops all solids. Easy to clean ... open waste cock, blow it out. Highest quality construction thruout. Range of sizes.

Transparent Bowl — you know it works; you see it work!

Write C. A. NORGREN

> 222 Santa Fe Drive Denver 9, Colorado





More Power To You

with Economical . . . practical . . . efficient

CONWAY CLUTCHES

(Patented in U.S.A. and Canada)

- PRECISION BUILT OF BASIC MATERIALS
- INTERCHANGEABLE STANDARDIZED PARTS
- BASIC DESIGNS AND ENGINEERING
- QUICK DELIVERIES ON CATALOG MODELS

The CONWAY CLUTCH

Co.

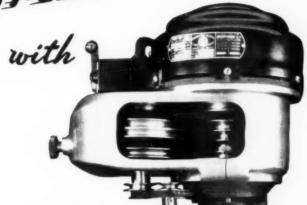
2745 COLERAIN AVE. CINCINNATI 25, OHIO Smooth, uniform, even power flow from source to equipment assured.... look into these Conway Clutches...it's worth your while.

Write for NEW Bulletin P-25 for data and technical information on Conway Disc Clutches



Series 550 Overhead Release Disc Clutch

SPEED UP TOOL WORK!



TREE UNIVERSAL MILLING HEAD ATTACHMENT

• ALL ANGLE MILLING, DRILLING, & BORING • COMPACT DESIGN • 34"

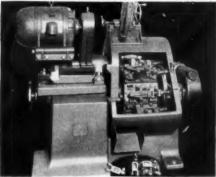
COLLET CAPACITY • 4" QUILL TRAVEL
• POWER FEED • EIGHT SPEEDS—1403500RPM or 210-5200RPM • HARDENED & GROUND SPINDLE & QUILL • ENCLOSED MICROMETER DEPTH STOP

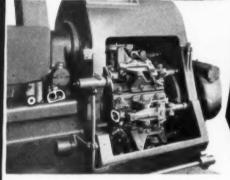
For Full Information - Write Dept. B



TREE TOOL AND DIE WORKS







for FAST,
ACCURATE
low-cost
PRODUCTION

WORK DATA

Part Shock absorber bodies Material last Iron

Operation Grand Face
Tolerances, 002" to, 003" for
Platness

Stock Removal 025" to .030"

maximum. Production 6 Co to 800 pieces per four

Feed Hand Look and gravity Univad Machine No. 122-23" Servi-

Automatic Hardner Grinder

HIGHLY-PAID labor using obsolete machines to work topprice materials, can't long survive. The solution is to modernize both methods and machines.

Modernized in design and construction, the No. 122-23" Semi-Automatic Gardner Grinder, shown above, carries an automatically revolving 8-sided drum with cam-clamping fixtures. This machine has helped shop officials to "lick" many high-production, lowcost problems — such as face grinding shock absorber bodies, as in the "close-up" photo.

You can reduce your flat-surfacing costs with modern Gardner Grinders —

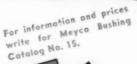
GARDNER-GRIND YOUR Flat SURFACES Write for our "MODERN METHODS" Booklet!

GARDNER MACHINE COMPANY

436 East Gardner Street * * * * Beloit, Wisconsin, U.S.A.

THE FIRST NEW IDEA IN DRILL JIG BUSHINGS...







HECTOR WAS A PUP!

Meyco Carbide-Inserted Drill Jig Bushings Cost a Little More, But Last Much L-o-o-onger!

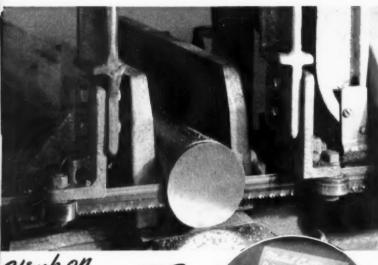
● Figure it out yourself: Actual field tests have shown that Meyco bushings with the carbide inserts outlast cast alloy, high speed steel and standard carbon steel bushings by 10 to 50 times . . . yet their cost is approximately 6 to 10 times that of ordinary bushings.

Meyco Carbide-Inserted Drill Jig Bushings will increase the life of drill jigs and fixtures, reduce non-productive machine time and non-productive man-hours, save on spoilage, save on inspection time and increase drill and reamer life.

No change is necessary in drafting room or tool design. Meyco bushings are made to ASA standards.



W. F. MEYERS CO., INC., BEDFORD, INDIANA



Climb on the SIMONDS BAND-SAW WAGON"

> Save Thousands of Hours by Band-Saw Cutting . . . instead of Shaping, Milling, Turning, Drilling

Getting to be a "Big Parade"... the

way shops are swinging to metal band-sawing . . . and seeping their one-purpose machines free to do the work for which they were designed.

Simonds Metal-Cutting Band Saws can do a score of jobs, and do them all at top speed and accuracy... cut-off work, contour cutting, and cutting of irregular shapes like jigs, dies, fixtures, as well as heavy straight production cuts... and many other similar jobs. And Simonds Metal Bands earn top profits on these jobs because they're made to stay on the job many hours longer . . . running smoothly, easily, cleanly. Simonds special steel, perfect tooth-milling and even tooth-set . . . those are the Simonds extras that have you

Send for this free book

extra on every Simonds Metal Band you buy. Order from your distributor today.



MANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 116 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore; 31 W. Trent Ave., Spokane 8, Washington. Canadian Factory: 595 St. Remi St., Montreal 30, Que.





Being of low, horizontal design, these Knu-Vise toggle action clamps offer no interference to tools operating above them. There are no handles to handicap the free movement of drills.

There's a model to meet your specific need.

Aodel HF-100 has closed toggle bar –one rubber cap.

Nodel H-200 provides channel for ositioning pressure spindle.

Model H-400 used where more clamping power is required.

Model H-600 provided with adjustable spindle.

Model HC-600 has closed toggle bar.

Send for complete catalog.

LAPEER MANUFACTURING CO.

General Sales Office: 2906 W. Grand Boulevard Detroit 2, Michigan
Manufacturers of the famous Knu-Vise Products, Lapeer, Mich.



MEET THE NEW ROTOR SCALE

Here is a rugged little 3 pounder with a heavyweight wallop... the Rotor S-1 Scaler. Try it on these production and maintenance jobs:

Weld slag removal • Spatter cleaning • Weld peening • Rust or paint scaling • Star drilling • Light chipping •

See how it cuts your costs.

Call in the Rotor Analyst to demonstrate new Rotor Scaler on your work. See how of the operator can control the blow . . . how swivel head allows flexibility in handling and positive chisel retainer assures safe opera and fast work in tight corners. Ask free copy of Bulletin 33.

AIR O'TO



THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



STURTEVANT Torque Wrench

Write for:

BULLETIN 10 15 describing the STURTEVANT torque wrenches in capacities from 0-8 in. oz. to 7200 in. lbs. or 600 ft. lbs.

BULLETIN SW 15 describing the STURTEVANT "Sensory" (high speed production torque wrenches). Minute or delicate threaded parts can now be correctly assembled, safely adjusted, or rigidly inspected by semi-skilled labor. With STURTEVANT Torque Wrenches, every operator has the same "master touch," tightens each thread exactly to the specified torque whether inch ounces or foot pounds.

STURTEVANT inch ounce TORQUE WRENCHES contribute materially to the uniform excellence of instruments, produced on a volume production basis. They can do much to assure the uniform excellence of your products because every STURTEVANT Torque Wrench is permanently accurate.

P.A. STURTEVANT CO. ADDISON QUALITY ILLINOIS



IT WAS A STEP FORWAL

When grampa changed from the

Old Flat Drill /

to the Modern Twist Drill



BE ANOTHER STEP FORWARD

When YOU change from the

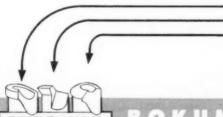
Old Hook Type Boring Tool to the A Modern Precision Boring Tool



TITH the old type of tool the clearance is usually ground by hand; even an experienced With the old type of tool the clearance is assumed that operator finds it difficult to control the clearance angles.

With the Precision Bokum Boring Tool the proper clearance is built into the tool. All resharpening is done from the top surface only, in this respect the tool is like a form tool wrapped around a shank, the curvature being such that the clearance angle remains constant throughout the life of the tool. As with any form tool the life of the Bokum Boring Tool is many times that of an ordinary tool.

> Available: Wide range of sizes for boring holes from 3 dia. up . . . in super high speed steel and Carbide Tipped.



For facing and bottoming, use Style B For internal threading, use Style C For general boring, use Style A

SINGLE POINT BORING TOOLS-INTERNAL THREADING, BOTTOMING AND FACING TOOLS-CARRIDE



The CP Super Cycle Grinder has the lowest ratio of motor weight to horsepower ever built into a portable tool. No speed sag when operator bears down. Removes more metal at less cost than any other type of grinder.

Maintenance is remarkably low. Squirrel cage induction type motor, operating on 360 cycle, 3-phase, 220 volt current, has no brushes to replace, no armatures to burn out.

Complete line of CP Super Cycle tools includes grinders, sanders, polishers, buffers, screw drivers, drills, nut runners, tappers, in wide range of speeds.

Write for full information.



ELECTRIC TOOLS • AIR COMPRESSORS • PNEUMATIC TOOLS • DIESEL ENGINES ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

if it's a l-o-n-g hard pull

USE BARBER-COLMAN CARBIDE-TIPPED MILLING CUTTERS

This solid, continuous cut in cast-iron, straight across a flat surface, is an ideal operation for B-C Carbide-Tipped Shell End Mills. Cutting Teeth, constantly engaged in the cut, need diamond-hard, sharp cutting edges to keep pace with production requirements. Constant contact with the material and the abrasive action formerly made frequent sharpening necessary with High Speed Cutters.

With B-C Carbide Shell End Mills, now used on the job, tool life is increased from 30 to 200 pieces per cutter sharpening, and production is increased 2 to 3 times over what was formerly obtained with HSS cutters.

Perhaps there are ideal conditions for carbide milling operations in your production lines. Carbide cutters cannot be expected to show



improved results on all milling jobs, but under certain conditions they show definitely su-perior production advantages. Why not send us specifications on one of your jobs, and let us recommend and quote the proper carbide cutters for your consideration. Call your nearest Barber-Colman representative today.

GENERAL OFFICES AND PLANT 123 LOOMIS ST., ROCKFORD, ILLINOIS, M.S.A.



HSS Cutter C-T Cutter

Feed..... 45 S.F.M. Speed Cutting Time 80 sides in 10 hours. Tool Life.

210 S.F.M. 146 sides in 10 hours.

MODERN MACHINES DEMAND Modern CUTTING TOOLS

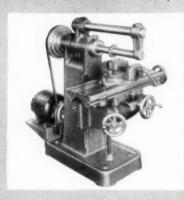
BENCHMASTER costs less than many accessories

...Yet is a complete dual purpose milling machine in itself!



Investigate BENCHMASTER
Milling Machines today!

The complete Benchmaster may be purchased for less than most large-mill accessories, yet performs as efficiently—and far more conveniently—than a large, bulky machine on all jobs within its capacity.



THERE'S MORE than one reason why Benchmasters win quick acceptance. Despite their low cost, Benchmasters remove a surprising amount of metal for their size. Compactness, ease and simplicity of operation get jobs done before setups can be made on larger mills. Interchangeable spindle quills permit both vertical and horizontal milling at one work setup. You eliminate fuss, time loss and inaccuracies of changing work position to complete your intricate milling jobs. And for accuracy, Benchmasters are on the money!

Write Dept. MT
for free circular!

benchmaster

MANUFACTURING COMPANY
2952 WEST PICO BOULEVARD
LOS ANGELES &, CALIFORNIA

MPANY Took

ORLD'S LARGEST PRODUCER OF SMALL PUNCH PRESSES

DEFECT

PROSSER Carbide Grinders





For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

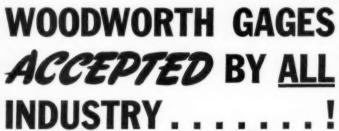
Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

Important features include:

- · Quick-acting indexing tables.
- · Adequate wet-grinding equipment.
- · High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- · Moderate price.
- Prompt deliveries.

Write for details

Thomas Prosser & Son



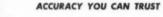
GREEN-GO





RED-NOT GO

Industry by industry—coast to coast wherever accuracy and durability count—Woodworth Company is winning and holding new friends—with the ACCEPTED ADJUSTABLE THING GAGE.



SEND FOR—The new 1948 Woodworth Gage Catalog just off the presses. Requests for copies must be written on company letterheads.

There's a Woodwarth representative near to serve you. Write us for his name.

WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD . DETROIT 20, MICHIGAN COMPLETE LINE OF PRECISION GAGES . DIAPHRAGM CHUCKS . CONE-LOK JIGS

INDEX VERTICAL MILLS

FOR THE TOOL ROOM OR PRODUCTION LINE

For use with end mills 1/s" to 1" in steel. Equipped with verniers, as standard equipment in addition to micrometer dials on table actuating screws for locating. Further accuracy available with rods and indicators which can be furnished as extra equipment.

If you want speed and precision on milling, drilling and boring send for a catalog on Index Mills.



INDEX MILLS

Index Mills participated in all important war production programs from camera and guns to atomic bombs. Ask any owner how they like their Index Mill.

12" TOOL ROOM ROTARY TABLE



A quality teel for precision work in the teel room or production line, incorporating such features as ball bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough. Iz" size only.

Write to Factory Sales and Distributing Agents for complete information

INDEX MACHINE

545 North Mechanic St.

Jackson.

Michigan

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

A PRODUCTO, MELCOSE CUTTING AID



Figure it out for yourself.

Recently we compared notes with a shop "making its own" special die sets.
Their toolroom time for one specific job was 180 hours...ours, for the same job, about 60 hours.

Why? Simply because we're specially geared to do that kind of work . . . with custom-built machines, tools and men who are die set experts.

We can save you money in 99 cases out of 100. Call Near Neighbor Service for details.

THE PRODUCTO MACHINE COMPANY . BRIDGEPORT, CONN., TEL. 4-9481

NEAR NEIGHBOR

INDIANAPOLIS 2, 635 Fulton St. Lincoln 5385

DALTIMORE 2, MD. L. A. Benson Co., Inc. Plaza 0340

PHILADELPHIA 40, PA. Wright & Gade Tool Co. Radcliffe 5-1467

R. C. Neal Co. Inc. Cleveland 1110 OETROIT 11, 3017 Medbury Plaza 3101

SYRACUSE 2, N. Y. R. C. Neal Co., Inc. 3-1181

CLEVELAND 14, 3200 Lakeside Ave. Prospect 4236

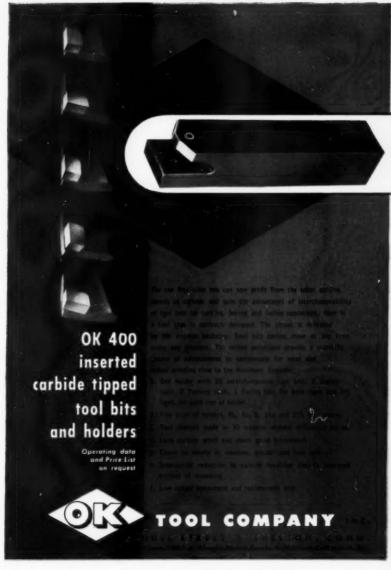
ROCHESTER 4, N. Y. R. C. Neal Co., Inc. Main 5249 NEW YORK 12. 197 Lafayette St. Worth 4-7484

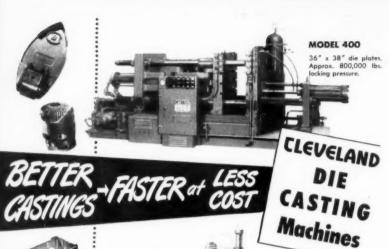
Service

LOS ANGELES 21, CAL. Jamison Steel Corp. Trinity 9827

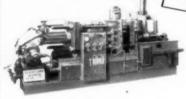
SAN FRANCISCO 7. CAL. Jamison Steel Corp. Exbrook 2230

R. C. Neal Co., Inc. 5168









MODEL 200

27" x 27" die plates. Approx. 400,000 lbs. locking pressure.



Here are two universal high-pressure hydraulic die casting machines, Cleteland-Built for high production of quality castings. Heavy, rigid construction welded, flame-cut steel plates—resists shock and strain, prevents stretch and distortion. Dies are held in accurate alignment, producing precision castings with minimum flash.

Cleveland design gives you easy access to dies; ample die area; sure-fire shot mechanism; flaw-proof quality of hot metal; rapid and positive core pulling and ejection; safe and simple control—either manual or full automatic. Simply changing hot metal ends converts both Cleveland models from zinc, tin or lead casting, to aluminum, brass or magnesium casting.

With both models working as your casting production team, Cleveland engineering further reduces costs. Construction on both models permits the maximum amount of interchangeability; platen and die plate T-slots are identical in size and location; goosenecks, nozzles, plungers, sleeves, etc., are interchangeable.

Let a Cleveland engineer show you the advantages these machines can bring to your die casting production. Send us details of your work. For complete machine specifications, write for bulletins.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4934 BEECH STREET . CINCINNATI 12, OHIO

CHICAGO (6) 3710 Civic Opera Bldg. CLEVELAND (14) 1114 NBC Bldg. DETROIT (2) 540 New Center Bldg. HARTFORD (1) 529 Capital National Bank Bldg. NEW YORK (6) 2402 Singer Bldg.

AMERICAN LASOSAL

BUSHINGS



IMMEDIATE DELIVERY

Complete stocks maintained at all times by exclusive distributors throughout the U.S. and Canada.

Precision made from finest oil hardened tool steel—ASA Standard—with concentric ground lead to insure perfect alignment.

FREE DELIVERY ANYWHERE IN THE U.S.A. OR CANADA

The STANDARD OF COMPARISON * FOR QUALITY and ACCURACY

SEND FOR NEW CATALOG and NAME OF NEAREST DISTRIBUTOR

American Drill Bushing

1110 So. Santa Fe Avenue, Los Angeles 21, Calif.
SPECIALIZING ONLY IN DRILL BUSHINGS



DUST FREE ROLLERS IN A NEW FLANGED TYPE SELF-CONTAINED ROLLER BEARING



Roller Bearing Pillow Block — Cast Iron Body



Roller Bearing Flanged Pillow Block



Flanged Roller Bearing

THE HEIM



FLANGED TYPE SELF-CONTAINED ROLLER BEARING

Whether used as a pillow block or applied directly as a roller bearing, the Heim Roller Bearing is a self-contained unit of flanged construction which is extremely simple to install. Dust and foreign matter is effectively excluded and lubrication is efficiently retained.



Heim also makes: Unibal Spherical Bearings Rod Ends Die Polishing Machines

Roller Bearing Pillow Block



COMPANY



4 LOGAN AIR CYLINDERS
for Clamping and
Unclamping the work

LOGAN AIR CYLINDER
for Starting and Reversing

the Hydraulic Table Feed

IN FULL AUTOMATIC CYCLE ON SPECIAL MACHIN

All movements of this special machine of automatically controlled in sequence by med of two Logan solenoid air valves of t bleeder-operated type. The cycle is as follow

1 The work moves through a channel until it stril the end stop and trips an electric control switch.

2 One Logan electric solenoid operated air valactivates four Logan air cylinders simultaneously clamp the work. At the end of the clamping moveme a cam trips an electric limit switch (center photo).

3 A second Logan electric solenoid operated valve then activates the fifth Logan air cylinder (typhoto), automatically starting the foot trips which cotrol the hydraulic table feed.

4 The table moves upward, feeding the work to cutters. Multiple wood boring operations are p formed simultaneously on telegraph pole cross are

5 As the table feed movement is completed, anoth limit switch is tripped, and the second air valve rever the table movement. This trips still another limit swit operating the first air valve and releasing the clampi fixture so the workpiece can be unloaded.

APPLY THESE ADVANTAGES TO YOUR WORK

Get greater speed, accuracy and efficiency in your plant and on your products...use Logan Air Valve for manual or foot, remote, automatic, semi-automat interlocking or sequence control of cylinder movement Call on Logan engineers for circuit recommendation No obligation.



Write for FREE literature on Logan air valves, cylinders and acOGAN (

LOGANSPORT MACHINE CO., INC.

CHUCKS - CYLINDERS - VALVES - PRESSES - SURE -FLOW COOLANT

hotos courtesy of B. M. Roet Co., York, Pa.

ZWIG!

You can get

DIAMOND BORING MACHINE RESULTS

from your lathe for

NO.

The Shearcutter Boring Bit is a revolutionary new invention with an entirely

different principle for cutting metal. For the first time in history it is possible to cut metal with a true knifelike action and leave the finish free from tool marks.



- It bores absolutely accurate holes.
- Usually eliminates necessity of reaming, grinding, diamond boring or honing.
- The bit may be rotated to present 10 to 20 new cutting edges before regrinding is necessary.
- Regrinding takes only one minute.
- Saves time, money, material and increases production.
- Designed by one of America's foremost tool designers.

SEND YOUR ORDER TODAY!

Watch for other Shearcut Tool announcements. Territories available for distributors. Tool holder and two bits-\$10.00.

SHEARCUT TOOL CO.

DEPT. MT, RESEDA, CALIFORNIA

PATENT WARNING: All fools manuluctured by Shousculf Tool Ca. ore prerecived by patents, putent applications and patents pending. Intringements will be vigorously prosecuted.

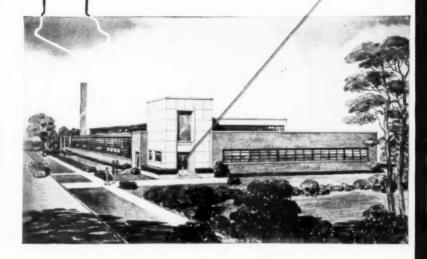
Boring Bit.

At left, the conventional type cutting bit is illus-

trated tearing the metal. At right, the slicing, knifelike action of Shearcutter

here is the new home

of the snow air-operated tapping, drilling and threading machines



It's something of an achievement to be recognized as an authority in your field. It's even more of an achievement to gain a reputation for quality and service at the same time. One reason the Snow Manufacturing Company has gained this reputation is its integrated operation—from the drafting table to the finished product. Every step is under direct control.

To maintain this policy, we have erected one of the finest and most up-todate machine tool plants in the country. Thirteen miles west of Chicago's Loop, it is easily accessible—bus and "L" lines practically to the door. Washington Blvd. if you are driving. Come out and see us.



441' EASTERN AVE., BELLWOOD, ILL. . SUBURB OF CHICAGO





to Saw Tough Alloys For cleaner, more accurate power machine cutting of hardest alloy steels - stainless, chrome, nickel, etc.—the Griffin High Speed Steel Blade is your best buy. 18-4-1 tungsten high speed steel, specially Griffin-tempered, with specially milled teeth. Made also in hand frame sizes.

OTHER GRIFFIN BEST BUYS

For most economical general machine use, pick the GRIFFIN-SPECIAL ALLOY molybdenum high speed steel blade . . . For utmost flexibility plus toughness in a hand frame blade pick the improved NEW GRIFFIN . . . For hand sawing thinnest sheet or tubing without tooth breakage, pick the GRIFFIN NON-STRIP

contour sawing pick GRIFFIN BAND SAWS; choice of hard-edge-flexible-back, spring-temper, skip-tooth and wood-cutting types.

For latest 20-page Griffin Price List write us.

JOHN H. GRAHAM & CO. INC.

Dept. E, 105 Duane St., New York 8, N. Y. ASK YOUR DISTRIBUTOR FOR

GRIFFIN HACK SAW BLADES and BAND SAWS

MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H. Hack and Coping Saw Blade Specialists Since 1880



IDEAL LIVE CENTERS

HELP TO CUT COSTS!

Says Joseph Dietz, general foreman of Republic Flow Meters Co., Chicago: "Ideal Live Centers give us greater turning speed and have helped increase production 15% to 25%. They save both grinding time and lubricating time."



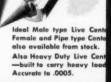
Says Fred Huer, machinist at Republic plant: "Ideal Live Centers improve the quality of the work. They eliminate chatter, center lubrication, and burned out centers."



In scores of plants the story is the same: Ideal Live Centers mean better work—at lower cost. No friction between the center and the work—no burning or gouging—deeper cuts and faster turning speeds. Ask for information and a free demonstration of the Ideal Live Center. Check its quality and unique construction. Look at its record of cost cutting service.

IDEAL INDUSTRIES, Inc.
1441 PARK AVENUE, SYCAMORE, ILLINOIS





Distributed Through AMERICA'S LEADING WHOLESALERS

CANADIAN DISTRIBUTOR: IRVING SMITH, LTD., MONTREAL

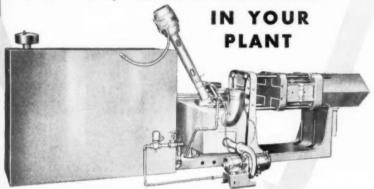
When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

NEW

HARVILL

DIE CASTING MACHINES

CUT COSTS, INCREASE PRODUCTION



Write for case histories and full cost cutting facts today!

Hundreds of Harvill machines are in use today . . . saving money and speeding production. There is a size and type for every use . . . to cast zinc, tin, lead, aluminum, magnesium and brass alloys. Write on company letterhead for full facts!





H. L. HARVILL MFG.CO.

CORONA, CALIFORNIA

YOU CAN *depend on* gears by



Get this valuable G. S. Small Gear Bulletin free. Ask for it on company stationery. Send for a copy now, and discuss your needs with our skilled engineers DEPENDABILITY is an important asset in the Small Gears you buy. It means that your product will give greater satisfaction..run smoother and quieter..over a longer period of time. G.S. Small Gear Craftsmen take pride in the superior excellence..the greater uniformity of their products. During 30 years of specialization they have reduced the quantity production of fractional Horsepower Gears to an exact science. Rigid and repeated inspections with every modern precision-measuring device has cut imperfections to the vanishing point. You can place implicit confidence in G.S. Small Gears..and in the kind of friendly, cooperative service we give.





Success or failure of your new product in post war competition may depend on your speed and cost of production. If a fastening operation is involved, Chicago Automatic Riveting will fasten it faster. . assure strongly fastened assemblies at low unit cost. From one to four tubular rivets or split rivets are fed, inserted and clinched in the split second it takes to release a Chicago foot pedal. Several models of Chicago Riveters are adjusted in just a few minutes to handle different sizes of rivets.

FASTEN ALL TYPES OF MATERIALS

Chicago Automatic Rivet Setters fasten wood to wood, composition to composition, fabric to fabric, metal to metal, leather to leather,

or any combination of these materials. They clinch grommets and eyelets, and insert drive screws as efficiently as they set rivets. Plan now to assure strong fastenings at higher speed and lower costs with Chicago Automatic Riveting. Write today, for catalog information.

Automatic Type Single Rivet Setter



LET US ANALYZE YOUR FASTENING PROBLEM

You can learn, without cost or obligation, how your fastening output may be speeded up, and costs reduced. Just send a blueprint or a sample assembly and ask for a fastening analysis. Our engineers will gladly analyze your particular problem. Production rates can be set up from the report they give. Make use of this expert service, as you plan new products.

Chicago Rivet

CHICAGO RIVET & MACHINE CO. 9610 W. Jackson Bivd., Bellwood, Ill. (CHICAGO SUBURB)

* CONE AUTOMATIC MACHINE COMPANY sees many COOD THINGS AHEAD

It is reported that

An optical comparator, developed by Westinghouse, compares the grain sizes of metal samples on a glass screen.

Westinghouse Lamp Div. is drawing tungsten wire as fine as .0018" a pound of which is 950 miles long.

The Hypermatic, a high-speed punch press made by Lempco Products, Inc. of Bedford, Ohio, is claimed to be vibrationless, even at top speed.

Union Pacific RR is experimenting with the adaptation of a 10,000 h.p. aircraft gas turbine to locomotive use

Minneapolis-Honeywell Regulator Co. has an electronic compass for aircraft that has no moving parts and can be used as a magnetometer in prospecting.

In the attempt to push air speeds into the transonic range, Curtiss-Wright Corp. has developed a propeller with crescentshaped, "swept-back" blades.

Brighter, cleaner and more durable shades of brown for enamels, paints, inks, plastics, etc. are forecast in duPont's announcement of its new pigment "Auric Brown."

The Type WAA Race Tester offered by Physicists Research Co. provides for both micro-inch measurement of surface waviness of inner and outer bearing races and control of production set-ups

Pharis Tire & Rubber Co. claims that its two-ply, glass fabric tire

is stronger than four-ply rayon.

The new Crosley is said to be the first postwar car with an aluminum body.

American Welding and Mfg. Co., Warren, Ohio, is ready to road-test its application of torsional springing to railroad car trucks.

Lundberg-Ryan Air Explorations have ordered two Bell helicopters specially equipped for oil and ore exploration.

The National Electrical Manufacturers' Association is engaged in the standardization of small electric motors, such as those used in household equipment.

General Electric Co. has designed pallets of corrugated board which save shipping weight and can be thrown away after one use.

The top of an 85-foot, milliongallon tank at the U.S. Air Force Olmstead Airbase is being formed by spraying concrete over wire mesh.

Volumetric measurement of corrosive liquids to an accurate approaching laboratory precision is made possible by a new meter made by Browser Inc. of Fort Wayne.



AUTOMATIC MACHINE CO., INC. # WINDSON, VERMONT, ILC.A.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

PRESS-RITE PRESSES



FIVE TO THIRTY TON CAPACITY

Many new features have been incorporated in the new models of PRESS-RITE PRESSES. A new improved clutch, a new positive single stroke attachment, improved brake, plus extra large die space. and many others.

> PRESS-RITE PRESSES have been tested and approved after many years of service in large and small manufacturing plants, tool and die shops, small inmanufacturers. etc. Investigate. Get all of the facts and complete specifications.

NO. 3 **30 TON**

See your local dealer or write Dept. B148

Sales Service Machine Tool Co. 2363 UNIVERSITY AVE. ST. PAUL 4, MINNESOTA

AMERICA'S GREATEST GRINDER VALUE

R E D D Y

- tool grinding
- · buffing
- wire brushing
- polishing
- general purpose grinding





UNITED STATES 6-INCH UTILITY BENCH GRINDER



For shops, garages, farms, home workshops and general industrial uses. COMPACT . . . powerful . . . precisionengineered . . . precision-built. For
grinding all types of edge tools and
general purpose grinding . . . buffing . . .
wire brushing . . . polishing. Sturdy
construction . . . well balanced.

MOTOR: ½3 hp, 3450 rpm, permanent split capacitor totally enclosed ball-bearing motor, WHEELS: 6"x3½"x½"; one coarse and one fine. TOOL RESTS adjustable to wheel wear. Heavy duty double pole switch in base.

CONTACT YOUR DISTRIBUTOR OR WRITE DIRECT

The UNITED STATES ELECTRICAL TOOL Co.

Sunnen Precision Honing Will CUT YOUR PRODUCTION COSTS

On Jobs Requiring Accurate Internal Diameters

Sunnen Precision Haning may cut your production costs in one or more ways. The experience of many manufacturers has shown that production of accurate straight round holes can be increased from 150% to 600%.

Because you can hold a tolerance of .0001" and less, costly rejects are held to a minimum.

Often other operations such as internal grinding or lapping can be eliminated, thus saving time and reducing costs.

With the Sunnen Precision Haning Machine you can produce a full bearing surface in any hole —in steel, cast iron, bronze, aluminum, carbide, ceramic, plastic or glass. A complete line of abrasives is available to produce any degree of surface finish desired.

The Sunnen Precision Haning Machine produces straight, round holes, corrects errors from previous operations, and duplicates sizes easily. Smooth, accurate surfaces assure interchangeability—and longer life for Sunnen-honed parts.

Sunnen Honing can provide real savings in long-run production costs, and even greater savings on short runs when frequent size changes are necessary.

Call in a Sunnen engineer or write for com-



SUNNEN PRODUCTS COMPANY
7935 Manchester Ave. Canadian Factory, Chatham, Onterio

Typical Examples



niversal bearing

oned to 10 micro

nch finish gives

inger service.

Line reamer bushings, diameter 2.375", accuracy held to .0001".



Miniature aircraft cylinder—smooth, accurate honing provides better compression and longer life.



Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.



Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface. **ELECTRIC MOTOR END SHIELDS**

must support rotors rigidly and accurately, yet due to the lightness of the casting, they are usually distorted in machining operations. The precision boring operation on the bearing seat in a multiple step fixture eliminates the inaccuracies and provides for maximum motor efficiency.

SIMPLEX



speed drive unit to control the boring spindle speed. The fixture is of the quick-clamping, adjustable type locating the part from the previously machined rabbet surface. A wide variety of pieces can be accommodated in a single machine with a minimum of changeover time required from one size end shield to another.

_Precision Boring Machines

STOKERUNIT CORPORATION

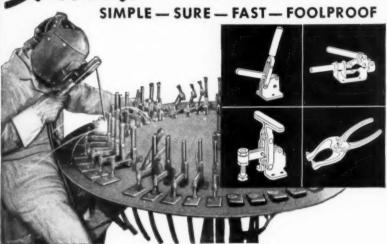
SIMPLEX Machine Tools Division

4530 West Mitchell Street, Milwaukee 14, Wisconsin

Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

SMART TOOLING!



Here's efficient tooling based on the quick action and positive holding power of De-Sta-Co Toggle Clamps. This simple turntable with its 48 No. 210-S clamps enables one welder to keep abreast of two helpers. One places curved shank in socket and unloads finished assemblies. The other locates pierced hole in plate over shank and locks securely with toggle clamp. The expert welder works without interruption.

Smart tooling like this is the backbone of modern mass production technique. You'll see De-Sta-Co Toggle Clamps playing a similar vital part wherever the principles of sound tool engineering are observed.

Welding production is *only one* of the many fields for quick acting clamps. For holding parts in milling, drilling, routing, riveting, cementing—for fast, uniform, *foolproof* action—progressive tooling demands De-Sta-Co adaptability and quality. There's a De-Sta-Co clamp for every job, designed and built to stand up under the wear and tear of volume production. Send for copy of Catalog No. 47.

DETROIT STAMPING COMPANY

347 Midland Ave.

Detroit 3. Mich.

NO KICK NO TWIST EVEN ON THE TOUGHEST JOBS

AMAZING all-purpose **ELECTRIC TOOL**

will

- . Drill up to 1/4 11 dia.
- . Ream up to 1/2" dia.
- . Tap up to 1/2" dia.
- . Run Nuts un to 3/4" dia.
- . Drive Screws up to 3/4" dia.
- . Hole Saw up to 11/2" dia.
- . Bore Wood up to 29/3211 dia. · Drive Studs up to 3/4" dia.
- . Drill Masonry up to 3/4" dia. . Extract Broken Studs up to 3/4" dia.
- . Wire Brush up to 3/4" dia. shanks.

(Uses Standard Attachments)

AMAZING! No Kick-No Twist-Even if you stall the spindle completely, the motor continues to run.

AMAZING! It's Reversible-full power in either direction-runs on 110V ac-dc.

AMAZING! It saves up to 90% of the time on nut-running operations alone.

AMAZING! With Standard Attachments you need only ONE INGERSOLL-RAND IMPACT TOOL to do all operations.

Call your nearest distributor for a demonstration

HARLEY-DAVIDSON MODERNIZES ITS SHOP



GREENLEE SIX-SPINDLE AUTOMATICS



SAMPLES OF MEDIUM AND SHORT-RUN WORK AT HARLEY-DAVIDSON . . .

WORK AT MARKET-WAVELOWS.

2) Epper Head Came Seat. C118 stock, run on 22 Greentle in lets of drive. 4th Armande 2017, see an Greentle in lets of drive. 4th Armande 2017, see on Greentle in late. 5th Previous method. 3 Starter Clutch, N18017 stock, run on a 22 stock of the 15th Armande 2017, see the in lets of 2014 with a time of approximately 2018 occurs occ

Ed Rathsack, screw machine foreman at Harley-Davidson Motor Co. of Milwaukee for 20 years, says: "I've been on screw machines for forty years. We got our first Greenlees just before the war and now have 16 of them. They have proved out very well. Set-ups can be made quickly and it is easy to duplicate previous experience. We have a lot of short and medium-run jobs of 800 to 10,000 pieces and set-up efficiency is a big help when you are trying to keep costs down on work of this kind. Standardized tooling helps, too. We appreciate the low investment in interchangeable cross-slide cams, and we like the quick setting on the main tool slide, For our kind of work, the Greenlees are good machines." (Mr Rathsack is the man with the galluses at the first machine - a 2 Greenlee Six - in the picture above. Harley-Davidson Motor Co. manufactures a widely-known line of Motorcycles, Servi-Cars, and Package Trucks.)



WRITE FOR MORE FACTS

SEE MOVIE Ask to see our 40-min sound movie showing all details of building a Greenlee "6"

GREENLEE BROS. & CO. 1831 MASON AVENUE, ROCKFORD, ILLINOIS

MULTIPLE SPURGLE DRILLING, EDERNE, EMPTING MACHINES . AUTOMATIC SCALW MACHINES . AUTOMATIC TRANSPER PROCESSING MACHINES



TIME NOW TO GET THE RIGHT ANSWER TO COOLANT PROBLEMS



CENTRIFUGAL COOLANT PUMPS

WORK MUST BE KEPT COOL . . . that's one law you daren't violate if you want to get results in your machining . . . and the proper coolant flowing through these time-tested, precision-produced pumps will do the trick . . . every time.

BETTER FINISHES

LOWER COSTS

LONGER LIFE OF TOOLS

A request on your letterhead will bring your personal copy of FULFLO MECHANICAL DATA BOOK.





Specialties Co., Inc.

for or PRODUCTION LINE



SENTRY ELECTRIC **FURNACES**

Sentry High Speed Steel Hardening Furnaces are flexible, quick to heat to operating temperature and noted for their reliability and operating economy. They are equally adaptable to the production line and to tool room use.

Sentry Furnaces provide a correct application of the Sentry Diamond Block Method—a scientific control for maintaining a neutral atmosphere. They are clean-no fumes-no wasted fuel. Work is scale-free, with no decarburization-no reduction in size. One operator can tend several furnaces.

There's a Sentry Furnace to meet your particular requirements.

The Sentry Company Sentry DIAMOND

FOXBORO, MASS., U.S.A.



ELECTRIC FURNACES BY SENTRY: HIGH SPEED STEEL FURNACES MEDIUM & HIGH TEMP. INDUSTRIAL . CRUCIBLE . POT . HIGH TEMP. TUBE LENOX METAL CUTTING BAND SAWS
are adaptable for use on
ALL TYPES BAND SAW MACHINES
in sawing ALL METALS



Unright Machine

nch Machine

ALL METALS

ALUMINUM PIFE TUBING

CAST IRON SHEET METAL

COPPER

TOOL STEEL

COLD ROLLED STEEL

DIE BLOCKS FORGINGS

RAILS

HIGH SPEED STEEL and all other metals

PLASTICS TRANSITE BUILDERS BOARD

LENOX

AMERICAN SAW & MFG. CO. SPRINGFIELD 1, MASSACHUSETTS

> toms - Band James - Flat Ground Stoc Tool Bits - Sitting Sons

STEPS TO BEW SQUARE HOLES IN

ORING BARS, CUTTER HEADS, TOOL HOLDERS



Drill and ream the hole in the part to size.
Sturdy Square Holed Sleeves are furnished to
the size shown in the specifeation table or they
may be ordered with .015" grinding stock so that
you can grind your Sleeve to 111.



2 Swent or press Sleeve Into place. If the Sleeve is longer than the diameter of the bar, the Sleeve should be set flush with the OD of the bar at the threaded end and the excess at other end ground off.



3 Drill and tap for set-screw. This set-screw is not furnished with the Sturdy Square Holed Sleeve although the back-up screw is furnished.

OVER 30,000 IN USE



One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many years and many



many years
and many
dollars in the
making of
boring bars,
milling cutters and
other tools
requiring



A tool holder made with Sturdy Square Holed Sleeves. Tool holders of all types can be made more quickly and at lower cost this way.

> Some Territories Still Open to Jobbers



This milling cutter is made from a simple blank turned to size on a lathe with Sturdy Square holed Sleeves sweated in to hold standard tool bits.

> Write for Literature

STURDY BROACHING SERVICE

23514 Telegraph Rd.

Detroit 19, Mich.

YOU GET ALL THESE ADVANTAGES IN

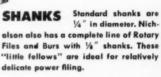
NICHOLSON ROTARY FILES AND BURS

STYLES A wide range of shapes and sizes from which to choose. Name almost any rough or delicate finishing operation and Nicholson will come up with a Rotary File or Bur that will save both time and money.



CUTS Available in either Hand
Cut (for use on tough,
dense materials) or Ground-fromSolid (for non-ferrous metals). Expert hand-cutters form the teeth of
Nicholson Rotary Files; precision
machines grind the flutes of Nicholson Burs.

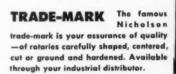
STEEL Nicholson regular Rotary
Files and Burs are made
from a special grade of high-speed steel,
expertly hardened and carefully shaped.



.

CODE SYMBOLS The Nicholson sys-

tem of identification makes for easy ordering. The first symbol identifies the style or shape of the head; second, the diameter of the head; third, the length of the head; and fourth, the coarseness of the cut.



NICHOLSON FILE CO.

94 Acorn Street, Providence I, R. I.
(In Canada, Port Hope, Ont.)

NICHOLSON ROTARY FILES

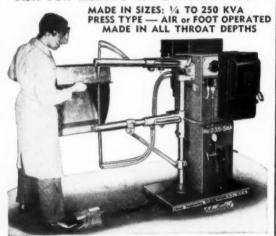
HAND CUT AND GROUND

FOR EVERY PURPOSE



SPOT BUTT ARC WELDERS

SPOT WELDER TIPS, HOLDER & HORNS ASK FOR EISLER'S TIP & WELDER CAT





TYPES: Furnace, Distribution, Lighting, Power, Auto, Phase Changing, Air, Oil or Water Cooled, Reactors and Special Transformers of all types.









Butt Welders



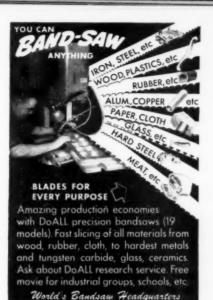
Spot Welders



Spot Welders
FOOT, AIR
OR MOTOR OPERATED

CHAS. EISLER EISLER ENGINEERING COMPANY, INC.

762 South 13th Street (near Avon Avenue) NEWARK, NEW JERSEY, U.S.A.



c for every pur EVERY SOLID MATERIAL ON EARTH can now be machined with DOALL CONTOUR SAWS MATERIAL REMOVING PROCESS Investigate amazing economies possible in your plant with Contour Sawing WORLD'S FASTEST

The DoALL Co. Des Plaines, Ill.

EXCLUSIVE METAL BY Patent No. 2,255,577 Design Pat. No. 127,3 Other Patents Pending

WITTEK *Automatic*ROLL FEEDS AND REEL STANDS For All Types of Punch Presses





Assures Fast and Accurate Feeding of Coiled Strip Stock

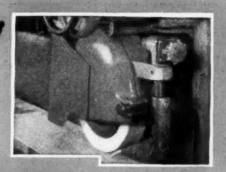
Wittek-Automatic Roll Feeds provide maximum efficiency in the high speed automatic feeding of all types of coiled strip stock to punch presses. Highly flexible in function and application, they are capable of feeding lengths up to 24" per stroke of the press and will handle various stock thicknesses in widths up to the maximum width of the rollers.

Wittek Adjustable Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock. If your production problem involves feeding coiled stock to punch presses, consult us. Your inquiry will be given immediate attention. Ask for completely descriptive catalog.

WITTEK Manufacturing Co. 4305-15 W. 24th Place, Chicago 23, Illinois Automatic
ROLL FEEDS WAS
AND
REEL STANDS

the grinding job

Horizontal surface grinding of alloy steel stock on a Mattison Precision Surface Grinder. Repeated precision results and a fine finish on a production basis make grinding wheel selection of prime importance.



the wheel

W Borolon vitrified bonded WA36-J8-VI, size 20" x 3" x 10" c/s one side 12\4" x 56"; c/s other side 12\4" x 1". Selected for cool, fast grinding without danger of burning stock. Efficient for grinding hardened and high speed steel; special alloys including high carbon high chrome types.



Borolon

Electrolon

SIMONDS ABRASIVE CO.

PHILADELPHIA, PA.

nding Wheels

Complete line includes every shape and size. Abrasive Grains Mounted Wheels and Points Surfacing Segments Bricks and Sticks



where to get it

Simonds Abrasive Distributors in all principal industrial centers of the U. S. and in many foreign countries carry stocks and can advise on grinding wheel selection. Write today for Manual on Modern Surface Grinding Practice. Also for name of nearest distributor.



Quality control has characterized Simonds Abrasive Company products during more than 50 years as a major manufacturer of grinding wheels and abrasive products exclusively. This control begins with the abrasive grain produced in modern electric furnaces by Simonds Canada Abrasive Co., Ltd., and extends to the finished wheels for all types of grinding from roughing to precision finishing. This means consistently high wheel performance on every grinding job.

SIMONDS ABRASIVE COMPANY . PHILADELPHIA 37, PA. . DISTRIBUTORS IN ALL PRINCIPAL CITIES



Trap abrasive dusts, and dispose of them, easily and economically, with

TORIT DUST COLLECTORS



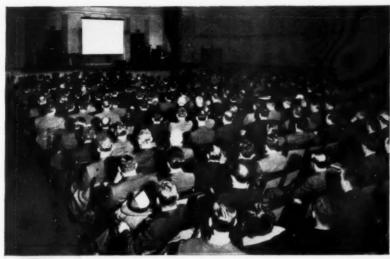
TORIT Dust Collectors are self-contained and portable. Attached at the machine, dust laden air is drawn into the cabinet, moving from the outside to the inside of a set of filters. Heavy particles fall into a tray, while the finer dust adheres to the outside of the filters. A few strokes of the shaking lever cleans the filter.

TORIT Dust Collectors, ranging in size from $\frac{1}{3}$ HP to 3 HP, are available for quick delivery. For complete information and the latest Torit catalog write:

TORIT MANUFACTURING CO.

303 Walnut Street

St. Paul 2, Minn.





The stage is set . . . and here's your cue!



Coming soon: The case of the elusive customer.

First, of course, you must find your buyers. You already have a good idea who they are . . but have you been able to reach them with a convincing selling display of your company's products?

The American Society of Tool Engineers is providing the stage and the audience for this at the Tool Engineers' Industrial Exposition in Cleveland. Ohio, next March 15-19—to help you make your contacts.

Curtain call

ASTE's last Exposition drew thousands of top executives, industrial engineers and tool engineers... the very men who dictate the purchase and can specify your product for their plants.

New and different products and methods, technical sessions, plant tours, industrial movies, all add up to a more businessproducing Tool Engineers' Industrial Exposition than ever before.

Extra Added Attraction

Coincidental with the Exposition, ASTE members will meet for their 16th Annual Convention and technical sessions in Cleveland. It's your big chance to sell the tool engineer . . . so make it a date for '48!

Marquee Remarks

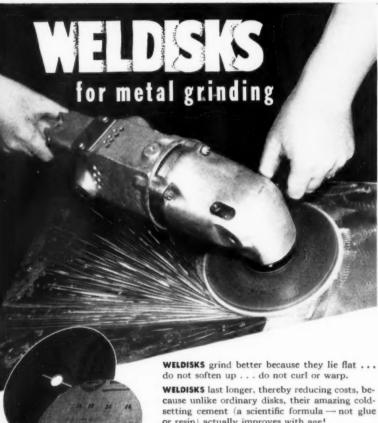
Time: March 15-19 • Place: Public Auditorium, Cleveland, Ohio • Produced by: American Society of Tool Engineers • Directed by: America's leading industrialists • Star Performers: All Tool Engineer Industrial Exposition exhibitors • Price: No advance in prices • Reservation: Write immediately.

For complete information write the

EXPOSITION COMMITTEE

AMERICAN SOCIETY OF TOOL ENGINEERS

1666 PENOBSCOT BLDG. DETROIT 26, MICHIGAN



or resin) actually improves with age!

WELDISKS are better disks. Prove it to yourself! Write for a free sample. State size of disk, grade of grit, and brief description of work to be done. A WELDISK will be sent promptly without obligation to you. Abrasive Products, 527 Pearl St., South Braintree 85, Massachusetts.



add up to TOP PRODUCTION

Vee belt used on final drive from gear box to spindle. Increases speed and sensitivity in drilling. Carries full horsepower from motor to job.

AVEY TYPE BMA-6

Four Spindle-12" Overhang

1st spindle - Avey-matic feed

2nd spindle-Plain power feed

3rd spindle - Hand Feed

4th spindle-Tapping (reversing motor)

STANDARD MOTOR - EACH SPINDLE

Each spindle of AVEY BMA-6 individually motor-driven by standard frame constant speed motor. Feet-mounted motor easily interchanged or replaced. Standard motors can be stacked.

SIX SPEED CHANGES

On the AVEY BMA-6 six speed changes are made through selective, sliding gears. This automative type of gear shift is controlled by a single lover at front of machine. Provides versatility and effective

SPEEDS OBTAINED - SLIDING GEARS

Selective, sliding geers of AVEY SMA-6 change speeds quickly and easily. Each geer is manufactured and finished by accurete, modern process, shaved, hardened and lapped. Insures smeath operation and long performance.

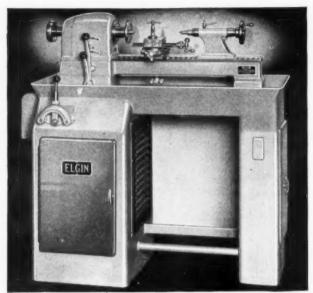


No. 28MA6-7/8" No. 38MA6-11/4" Single to six spindle machines, equip

AVEY DRILLING MACHINE CO.. CINCINNATI 1, OHIO

Gentlemen: Please send without obligation your new Bulletin 647,

COMPANT_ ADDRESS.



Now Provides Operator Comfort

- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

Write for full details.

ELGIN TOOL WORKS

1772 BERTEAU AT RAVENSWOOD AVE. - CHICAGO,13 ILL.



Foundry and metal-fabricating shop operators are overwhelmed with their increased piece work production from BAYFLEX RAISED HUB DISC WHEELS.

Yes, where heavy duty portable grinders and sanders are used the jobs can now be done much faster-easiercleaner. No wonder that BAYFLEX is so popular with management and operators alike!

The merits of this new product are many . . . the production possibilities unlimited. To appreciate the full value of BAYFLEX however, you must see it in operation. Ask for a demonstration at your plant. No obligation.

> Branch offices and warehouses -Chicago - Detroit Distributors - All Principal cities



== GEARGRIND ==

CONTRACT GRINDING SERVICE

For a single piece or production runs, GEARGRIND has the plant facilities, equipment and know-how to meet your requirements on all types of Formed Wheel Grinding. Your work will be accurate, finely finished, and delivered on time. This service is available for:

Extrenal Spur Gears

From ½" to 33" O.D. 1¼ to 64 pitch. Pinion gears up to 60" between centers. Any desired pressure angle.

Internal Involute Spur Gears and Splines

From 21/2" to 17" P.D. 4 to 64 pitch. Maximum face width 5". Any desired pressure angle. Number of teeth up to 200. Maximum O.D. 26". V shaped Splines of any included angle.

External Helical Gears

From 1" to 1334" O.D. 4 to 28 pitch. Face width up to 234". Left or right hand helix. Minimum lead 814". Any desired pressure angle.

Splines and Serrations

Up to 16" diameter, 60" between centers, parallel sides or V shaped of any included anale.

Internal Helical Gears

We have limited facilities for grinding this type gear.

We have ground experimental gears with 160 teeth, 10 diametral pitch. 22° 30' pressure angle. 26° helix angle. 173/4" O.D. We invite inquiries for this type of work.

Straight or Oblique Racks

lengths up to 26". Width of work up to 4". From 3 to 32 pitch. Any desired pressure angle.

We also produce master gears, spline gauges, spline work arbors, plug gauges, cluster gears and gears of cramped design, punches, dies, sprockets, and master index plates.

Don't Scrap Those Gears Or Splines!

Before scrapping any gears or splines because of distortion in heat treat or errors in machining, ask us about SALVAGE GRINDING. We have saved our customers thousands of dollars by putting our superb grinding facilities and years of experience into salvaging operations.

You can save time and expense by using the Geargrind Contract Grinding Service.

What you believe to be a complex problem may be a simple grinding operation to us, as the work is done on machines manufactured by us, giving us full advantage of their versatility and speed.

Write for Full Information

THE GEAR GRINDING MACHINE COMPANY
DETROIT 11, MICH., U.S.A.



(F) HYDRAULIC CYLINDERS

Many standard sizes and styles . . . both cushioned and non-cushioned types. 1000 lb. to 50,000 (direct) power movement.



AIR CYLINDERS

Widerange of styles, sizes and strokes. 100 lb. to 12,000 lb. (direct) power movement.



(T) CLINCHORS

Automatically feed and set clinch nuts in auto-motive body panels, door locks, other products. Save time and labor.



TO RIVITORS

Automatically feed and set rivets. Air powered for aluminum alloy rivets 1/16" to 1/4" dia. incl. up to 3/4" incl. long. Electo 34" incl. long. Elec-trically powered for solid steel rivets 1/16" an 1/4" dia. incl. up to 1/4" incl. long.





Die sinking milling cutters for accuracy, sturdi-ness and more work between grinds. All and sizes.

TO AIR CONTROLS



Designed for air cylnders in semi-auto matic or automatic operating cycles. Easy to install.

SAVE LABOR on TOUGH JORS

This year-T-J labor-saving Products will be more important than ever to plant operators who want increased production and lower costs!

Check your needs now! If your plant has tough jobs for air cylinders . . . hydraulic cylinders . . . Rivitors . . . Clinchors . . . or air controls-specify T-J! You can depend on T-J to do the job right. All T-J products engineered with the know-how of more than a quarter of a century . . . precision-built for utmost accuracy and dependability.

The Tomkins-Johnson Co. Jackson, Michigan

Send latest illustrated catalogs on the following T-J Products designed to save labor on Tough Jobs. No obligation. Clinchors
Air Controls

Hydraulic Cylinders Air Cylinders

Company..... Street City State

(T:J) TOMKINS-JOHNSON Stortings are two espansion consequent danties triescent.

WHY BUY LATHE PARTS YOU NEVER USE? Consider this ECONOMY set-up



ADD Your Choice of Drives and Equipment

Single speed, four speed, allelectric multi-speed and low speed chain drives. Manual or air operation of collet, expanding mandril or chuck. Cross-slide with hand screw

or rack and pinion feed,
Six station flat turret and
self-indexing stop,
Manual capstan operated carriage

Power feeds for turret, carriage or cross-slide. Special equipment designed for your work.

"BASIC UNIT + PARTS" PLAN of the MINNEAPOLIS PRODUCTION LATHE

You can save money on production lathes—and further hold down your cost by adding only the equipment needed for your particular job! When you buy the MINNEAPOLIS Lathe, you get a high speed, heavy duty model with large spindle capacity—a machine that takes heavy cuts without "chatter" and inceases your output. 2½" Spindle capacity, 14" swing, 4 different drives. Let us quote you on a "tailor-made" lathe for your work. Simply send sample part or drawing.



CENTRAL MACHINE WORKS CO

Machinery Designers and Manufacturers Since 1890

1252 Central Ave., Minneapolis 13, Minnesota

ABSORB SHOCK



With GLENZER Precision Live Centers

Let this Shock Absorber soak up the shocks which are bound to occur in all machining operations, due to heat expansion. The three-layer resilient pad "Shock Absorbers" automatically compensate for this expansion. This relieves excess pressure on the Timken bearing, which seats on this pad. Glenzer Live Centers quickly pay for themselves in longer tool life.





Expanding Mandrels

Requires No Tailstock

No Extra Tooling

Fast Chucking Without Stopping Spindle

Operated By Most Collet Closers

Easy To Set Up And Take Down ROSS EXPANDING MANDRELS are precision built. Designed to handle larger work on small lathes, i.e. Logan, Atlas, South Bend, etc.

For speed...ease of operation...accuracy
 ... use a ROSS EXPANDING MANDREL.
 Supplied in sets or individually.

Write for complete details today. Ask for a quotation on a unit that will increase your small lathe production.

Dealer inquiries invited.



THOMAS G. ROSS CO.

312 F. WISCONSIN AVE.

MILWAUVEE 9 WIS



Leads Again NOW... infinitely variable speeds!

Speeds easily adjusted — dial (not a rheostat) graduated from slow to fast speed.

NOT 3 STEPS — BUT GRADUAL CHANGE FROM SLOWEST TO FASTEST SPEED



\$220.00 Other models \$170 to \$250

Locking shaft holder holds shaft handpiece securely for stationary use.

Cabinet Type - Totally Enclosed - Can be used a Stationary Grinder. Provides instantly selective prope speeds for different sizes of wheels and for variou operations.

- V Jackshaft has eccentric adjustment for belt tightening.
- √ Precision ball bearings in speed changer, in jackshaft and in flexible shaft handpiece.
- **V**Flexible shaft ha WYCO Patented Nor Metallic Innerliner-Makes the core longer, run smoothe transmit more power.
- V Low center of gravity-Machine will not ti over.

841 W. HUBBARD ST. WYZENBEEK & STAFF, INC

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



If you have precision gears or non-gear parts to be produced in sufficient volume, a Gear Shaper is a sound investment. The Fellows cutter, as applied to a wide variety of work, provides exact duplicating accuracy at the lowest possible cost per piece. Again, the wide versatility of your Gear Shaper makes it the "busiest machine" in the shop...a money maker for you. Bulletins are available on a complete line of Gear Shapers for capacities up to 100 inches.

he Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher wilding, Detroit 2, 640 West Town Office Building, Chicago 12, 7706 Empire State Building, New York 1.



C DRILL JIG BUSHINGS

Writing Advertisers Please Mention MACHINE and

Made from the finest steel obtainable for the purpose. Each bushing carefully heat treated 62 to 64 Rockwell C hardness. All bushings inspected for accuracy of size, as

well as for concentricity.

New catalog gives sizes. Sent, with price the tool engineer, standard bushing list and other information indispensable to upon request.

BOSTON, MASS. M. A. Siebert Co. Garrison 0104 RICHMOND, VA. N. B. Shriner Richmond 7-7290

LOS ANGELES. CALIF. Waiter W. Miller PRospect 2687 The Commonwealth Sales Co. Grant 1362 Albert R. Born BElaware 6-3553 Cariton Eberhard Wisconsin 7-9193

Garwood, New Jersey. Stock of all popular lypes and sizes maintained at Cleveland, maintained at Complete factory stock Dayton and Stratford.

REPRESENTATIVES

CHICAGO, ILL. ott Production Teel Ce. ARmitage 3364 DAYTON, OHIO CALANDO, FLA. Charles W. Bringman Telephone 2-3747

STRATFORB, COMM. Ellsworth Steel & Supply Co. BRidgepart 7-3317 BAVENPORT, 10WA Bavenport Engineering Corp. DAvenport 2-1791

MINNEAPOLIS 2, MINN. Chas. W. Stone Co. Geneva 8631 MALWAUKEE 3, WIS. The Stone Company, In Broadway 2452 Fink Tool Co. Monree 8679

INDIANAPOLIS, IND. Jeneral Supply & You! Corp Lincoln \$353

ACCURATE BUSHING COMPANY

Westfield 2-2415

435 North Avenue, Garwood, N. J.



At the production rate of three pieces per minute, the S. K. Wellman Company of Cleveland, Ohio, is performing grooving operations on powdered metal aircraft parts approximately four times faster than ever before. This has been achieved by incorporating several automatic devices with a Standard Walker-Turner Radial Cut-Off Machine to convert it into an automatic radial grooving machine.

For this grooving operation the Radial Cut-Off Machine is equipped with a diamond impregnated metal wheel to do the cutting, and a magnetic chuck for work holding. The sliding head is motivated by an air cylinder with provisions for metering the feed. With this set-up extremely accurate work is done

FOR EXAMPLE

GROOVING OPERATIONS

by S. K. WELLMAN COMPANY
with WALKER-TURNER
radial cut-off machine

-the depth of each groove held within .003", and the accuracy of the index within .005".

In addition to increased production. Walker-Turner Machine Tools have given the S. K. Wellman Company continued operation with trouble-free maintenance. Says Mr. S. E. Truesdell of the company's engineering department: "Three Walker-Turner machines have been in our possession about five years. and in that period a very minimum, if any, maintenance has been required. We find these machines ... are highly adaptable to intricate machining jobs with minimum set-up time."

For complete catalog, write to Walker-Turner Company, Inc., Plainfield, New Jersey.



Photo, left: Radial Cut-Off Machine in S. K. Wellman set-up for radial grooving with magnetic chuck and diamond wheel. Indexes automatically at the end of each ram traverse cycle.

Photo, above: Radial Cut-Off Machine, Model MR/ 1130, 3 h.p., 3450 r.p.m. motor. Price: Less abrasiv wheel, magnetic overload release and base \$485.00

14" Woodworking Band Saw, BN-905. Price: less base, motor, gear assembly and belt guard, \$129.50. For conversion to metalworking, speed reduction gear assembly and slo-speed motor available.



4 TIMES FASTER

SOLD ONLY BY AUTHORIZED INDUS-TRIAL MACHINERY DISTRIBUTORS waker MACHINE

DRILL PRESSES—HAND AND POWER FEED RADIAL DRILLS - RADIAL SAWS METAL-CUTTING BAND SAWS POLISHING LATHES FEXIBLE SHAFF MACHINES RADIAL CUT OFF MACHINES FOR METAL MOTORS - SELT & DISC SURFACERS

MADISON *BOREAMING performs miracles with minutes

Madison Boreaming drastically cuts time from hole finishing and improves the quality of the holes obtained. It is possible only by teaming together the new Madison Rough Boring Tool and Completed Boring Operation

the Madison Finish Boring Tool. Teamed together for Boreaming, these two tools deliver finished holes usually achieved only through the use of three to five ordinary tools.



FEATURES OF MADISON *BOREAMING

It is often practicable to comine roughing and finishing cutters n one bar to perform roughing and inishing in one pass of the tool. A Madison cutter may be slipsed from a Madison bar and set to different diameter or replaced by sharpened cutter in a matter of econds.

3. The cutter of a Madison Finish Boring Tool may be floated in the bar. No special floating tool holders or chucks necessary.

4. Madison Rough Boring Tool and Madison Finish Boring Tool are interchangeable in the same setup. Permits performance of both operations successively if desired.



Write for the new Madison Catalog.



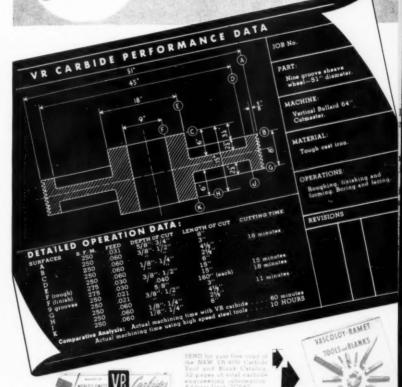
MADISON MANUFACTURING

COMPANY

MUSKEGON, MICHIGAN

*V-R Carbide . increased production

600%



VASCOLOY-RAMET CORPORATION NORTH CHICAGO

As affiliate of The Factored Metallurgical Corporation and The Venedium Allove Steel Company



HYDRAULIC CYLINDERS

 SUPERIOR DESIGN. An improved type of high pressure hydraulic cylinder. Universal end caps for easy installation and simplified maximum power, lasting "leakproof" operation. No-tie-rod design.

maximum power, lasting "leakproof" operation. No-tie-rod design.

• PRECISION CONSTRUCTION. Cylinder TRU-BORED from steel and honed to satin finish by exclusive Hannifin long stroke honing process. Close tolerances between piston and cylinder. Manufactured with precision tooling throughout to insure complete interchangeability of parts.

• COMPLETE LINE. 12 standard bore diameters, 1" to 8" . . . any length stroke you specify . . . 11 standard mounting styles . . . standard, double end, or heavy duty (2:1) piston rods . . . available with adjustable cushions . . . pressure to 1500 lbs. per sq. in. Special types built to order.

 ÉNGINEERING RECOMMENDATIONS. Let Hannifin engineers help you get the BEST solution for your hydraulic cylinder problems. Recommendations backed by more than forty years of specialized engineering experience. See your local Hannifin representative, or write.

HANNIFIN

Nationwide .
Sales and
Service

HANNIFIN CORPORATION

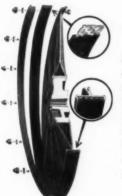
AIR CYLINDERS - HYDRAULIC CYLINDERS - HYDRAULIC PRESSES PNEUMATIC PRESSES - HYDRAULIC RIVETERS - AIR CONTROL VALVES

Cut BAND SAW COSTS with CARTER equipment

Surprising new economies are available to your band saw department when you adopt CARTER Band Saw Equipment. Immediately you will realize a reduction of costs and an increase in output, because, you will obtain more accurate, continuous cutting at greatly increased speeds.

- **★ Carter Rigid Band Saw Wheels**
- * Carter Quick-Change Tires
- * Carter Micro-Precision Guides







Standard equipment on most leading band saws. Scientifically designed. Constructed of aualified materials.

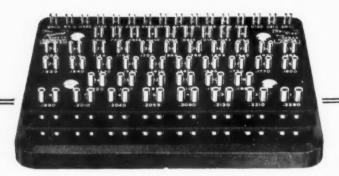
CARTER

960 Michigan Trust Building Grand Rapids 2, Michigan

WRITE TODAY!

You, like thousands of other progressive manufacturers will be interested in the features and extra values provided in CARTER Band Saw Equipment. Complete details furnished upon request.

Band Saw WHEELS . TIRES . GUIDES + GUIDE



DRILL SIZE PIN GAGES

Class Z Accuracy

LETTER SET—52 gages in 26 pairs from A to Z. \$45 set.

FRACTION SET—60 gages in 30 pairs in steps of 1/64" from 3/64" to 1/2", \$50 set.

NUMBER SET — 120 gages in 60 pairs from 1 to 60, 590 set.

All sets include stands ... Prices F.O.B. Bridgeport, Conn. Polished Radius Top

TOLERANCE +.0001 -.0000

Overall Length 1½"

LOWER HALF CONCENTRIC TAPERED for easy insertion

Oil Hardened Tool Steel

Sets in pairs of gages for checking any number of similar holes. Stands have 3 plates and cover so that gages stand upright. Dril! size is plainly stamped in front of each gage hole, together with decimal equivalent to the ten thousandth of an inch.

IMMEDIATE DELIVERY — 116 SIZES

Check or M.O. should include .08c postage for quantities less than Set. Sets shipped Express Collect. No C.O.D.'s.

THE Horbery GAGE COMPANY

19 STAPLES STREET. BRIDGEPORT 1, CONN.



NEW Procunier Foot Pedal Tapping Machine

New advanced design, new construction features mean new speed and accuracy for all kinds of tapping. Special compensating springs assure accurate tapping . . . even with "green" operators. Two long, compensating springs take all the guesswork out of both bottom and through tapping. Tap feeding and reversing pressures may be pre-set for each tapping job. Dull or "loaded" taps are quickly spotted. The automatic lubricating system delivers just the right amount of lubricant to the tap each time the foot pedal is depressed. Two interchangeable tapping heads accommodate a wide range of tap sizes.

Save Time and Money with a Procunier

As a result of these, as well as many other advanced features tap breakage is reduced . . . accuracy is increased . . . production is speeded up. Larger Procunier Tapping Machines, both with and without special lubricating systems, are available.

Write today for illustrated bulletins on Procunier Tapping Machines, Tapping Heads and the new lightweight Tru-Grip Tap Holder...

Procunier

Safety Chuck Company
14 S. CLINTON ST. CHICAGO 6. ILL.

Procunier Safety Chuck Co. 14 S. Clinton St., Chicago 6, Ill.
Send me bulletins on () Procunier High Speed Tapping Heads. () Procunier "Tru-Grip" Tap Holders. () Universal Tapping Machines.
Name
Address

Use DIETLL TURRET LATHES for those Production Jobs



OU can't beat Diehl for smooth accurate cutting to rigid specifications . . . just the lathe for those "production" jobs. In addition to its high speed precision performance, it works right alongside other No. 2 lathes of standard make—using same tooling, including collets. Write today for complete specification folder and details.

Swing-over Bed14"
6 speeds.....forward and reverse
6 feeds......to turret slide

The G. M. DIEHL MACHINE WORKS, INC

WABASH, INDIANA

U. S. A.

Teatured in this issue

ACCURATE MACHINING OF EXTERNAL AND INTERNAL STRAIGHT-SIDED SPLINES; by Douglas T. Hamilton. Production of straight-sided splines presents a problem different from production of involute splines if interchangeable accuracy between external and internal splined parts is desired. A special type of gear shaper and cutters produce straight-sided splines by a forming process. Page . . . 149

WORK CLAMPS, SUPPORTS AND FAS-TENINGS FOR USE WITH DRILL JIGS, by C. W. Hinman. The author introduces some essential applications of standard work clamps, fastenings, work supports and jig accessories. The discussion covers precision fastenings—i.e., cam-hooks, cam-disks and latch-hooks—and non-precision fastenings for clamping work—i.e., tapered keys, drawbolts, thumb screws and nuts. Page 168

 Page
 .231

 NEW TECHNICAL BOOKS. Page
 .235

 WHAT'S NEW IN METALWORKING.
 Page
 .239

 MECHANICS THROUGH THE AGES.
 .340

125

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

SOUTH BEND 14" Drill Press

South Bend presents this new 14" Drill Press as a companion to the South Bend Precision Lathe. It is built with the same high standards of accuracy and skilled workmanship. It is a superior tool unsurpassed for accuracy, easy operation, dependable performance.

FEATURES and SPECIFICATIONS

BELT TENSION RELEASE

Quick-acting belt ten-sion release lever simplifies speed changes. Keeps tension correct.

BUILT-IN LIGHT Provides shielded illu-mination for work area.

Separate on-off switch.

SPINDLE

Free-floating design prevents misalignment, side thrust, and whip.

BALL BEARINGS Sealed, precision type. No oiling, 2 on spindle drive unit, 2 on spindle.

QUILL BEARING

Compensates for wear.

DEPTH GAUGE Graduated in inches. Adjustable collars con-

trol feed and return. RUGGEDLY CON-STRUCTED

Precison-built for in-dustrial and all other types of shops.

TWO MODELS Bench or floor type

CAPACITY

circle.

CHUICK

Capacity 0 to 1/4" SPEEDS Four-707 to 4322 r.p.m.

CHUCK TO BASE

Bench Model . . 17" Floor Model . . . 46½"

TABLE SIZE 10" x 10" . . Tilt Type

COLUMN 23/4" diameter. Accurately ground.

HEIGHT Bench Model . . . 351/2" Floor Model . . . 651/2"

SHIPPING WEIGHT Bench Model . 195 lbs. Floor Model . 235 lbs.

MOTOR REQUIRED h.p., 1725 r.p.m. Vertical mounting. Onoff switch provided.



f.o.b. factory, bench model with chuck, extension cord and switch; less motor.



SOUTH BEN

BUILDING BETTER LATHES SINCE 1906 . 426 EAST MADISON ST., SOUTH BEND 22, INDIANA

As the MITOP SEES IT.

PLAN YOUR FUTURE TODAY

1947 was a flush year, with numerous companies reporting the most profitable peace time year in their histories. While this may not be true for some companies, 1947 was still not the year the locusts ate. Such a state of business is highly desirable. It also represents an auspicious time to plan for the future.

Already a few gaps stare blankly from some order books, and while 1948 will probably not usher in the Great Competition, order book gaps are a warning signal of approaching storms and should be the occasion for arming. The coming competitive battle will be won by the best armed with the newest equipment, best personnel, and shrewdest marketing campaign. One can't fight modern battles with 1930 derelicts, and hope to win.

1947 plants produced to capacity, using equipment anywhere from five to ten years old, which proved inadequate to reduce manufacturing costs. If this equipment was inadequate in 1947, how can it reduce manufacturing costs in 1950 when cost reduction determines the profit, or the lack of profit?

We realize no manufacturer will buy 100 modern machine tools, latest material handling devices, cut his labor force in half, then push a button and expect a 100% increase in production and a 50% reduction in costs. But we do believe a manufacturer shortsighted for not obtaining modern tools and accessories in numbers commensurate with his profits, tax and depreciation schedules notwithstanding.

The use of special machinery, new types of machining methods such as the abrasive belt method, and new machine tools, will reduce manufacturing costs in 1948, at the same time forming the nucleus of a hoard of powerful weapons for the future. Mr. A. G. Bryant, president of the N.M.T. B.A., recently stated, "...speaking of modern machine tools, increases in efficiency range from as little as 10% on a few types to as much as 500% on some remarkable developments." With such tools are battles won.

Let us not enter the lists poorly prepared, let us not waste the opportunity to plan constructively.

Happy New Year!

William 7 Schleicher

Editor

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
Getting Authentic Information

CARBORUNDUM



Being so closely identified with the development and progress of abrasives, it is natural that The Carborundum Company should be the source of so much authoritative literature on their application, care, and handling. Certain highly successful concerns regard the helpful service of technical and engineering literature supplied by The Carborundum Company as a significant point their preference for abrasives by CARBORUNDUM. Ask your Carborundum representative for literature and bulletins related to your own grinding and finishing operations. The Carborundum Company, Niagara Falls, New York.

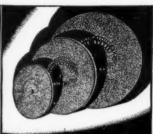


CARDONUNDUM" IS A REGISTERED TRADEMAIN WHICH INDICATES MANUFACTURE BY THE CARROLEMOUM COMPANY

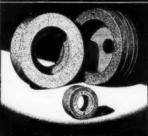
A Good Rule for Good Grinding



Specialized wheels by CARBORUNDUM for thread grinding



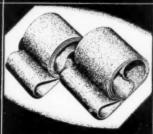
Cutting off wheels ... the modern tool for faster, less costly, more linished cuts.



Cool-cutting green grit wheels for cemented carbide



Diamond wheels to meet stiffer technical needs.



A coated abrasive for every



All standard shapes are supplied in grinding wheels by CARBORUNDUM

.. CALL IN

CARBORUNDUM

TRADE MARK

● BONDED ABRASIVES ● COATED ABRASIVES ● ABRASIVE GRAINS AND COMPOUND

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



We're not Doing You a Favor!

In these days of critical shortages, some firms seem to consider it a favor to provide a needed product. But here at Ryerson you'll find no seller's market complex. Every inquiry is still regarded as an opportunity to serve and every order a compliment to our organization.

Prompt shipment of steel from stock is our business. When we can deliver needed steel, we're more than glad to do it. The thanks belong, not to us, but to you for letting us work with you.

That's the way we have done business for more than 104 years—through good times and bad, and that's the way we continue to operate.

Much as we'd like to handle every item

on all vour orders, present conditions often make this impossible. But stocks of alloys, stainless bars, seamless tubing, and many other products are in good supply at each of our twelve plants, and products or sizes out of stock today may be available tomorrow.

So contact your nearest Ryerson plant for prompt, personal service. We may not always have all the steel you need but we'll certainly do everything possible to take care of you.

Joseph T. Ryerson & Son, Inc. Steel-Service Plants at: New York, Boston. Philadelphia, Detroit. Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

Cams

THEIR PRODUCTION AND APPLICATION

BY JOHN E. HYLER



This is the first of several parts on the subject of cams: their application and production. Various methods used in the manufacture of cams, and the equipment available for efficient production will be discussed. Mr. Hyler, an able technical writer, with many years' experience, is no stranger to BLUE BOOK readers. His present series on cams promises to be an excellent addition to the available literature on this important subject.

THE SCOPE comprehended under the above title is large. Cams, in general, do not compete in the ordinary sense with other types of motion-producing mechanisms. It is seldom wise to use a cam and follower for obtaining or producing any given motion that can be consistently derived otherwise. The reason is that a cam, as compared with other motionproducing elements, usually has a relatively small contact surface for the amount of work it is called upon to perform. Therefore, it wears more rapidly than most other actuating devices. There are countless required motions to be obtained, however, where the machine designer cannot well avoid the use of one or more cams, of one kind or another, without making the machine in hand highly complex, or in some other manner unsatisfactory.

The actual function of a cam is to impart a predetermined motion, or group of motions, at predetermined velocity, to a so-called follower. Some cams are stationary, and are machined with a curve or a contour calculated to produce auxiliary motions on already-moving parts, coming into contact with them during traversal. Thus, a stationary plate cam, with a



Shown here is an interesting group of cams manufactured by a firm specializing in screw machine cams and other screw machine auxiliaries. (Photograph courtesy of Modern Collet and Machine Co.)

predetermined curve or contour on one edge, can be used to change or modify the motion of parts traversed past and in contact with it. A hollow or cutout stationary plate cam will likewise produce desired auxiliary motion on a follower or followers mounted on an assembly, which revolves inside of the stationary cam. An instance in point is found where radial-piston pumps. having their radial pistons disposed around a rotor, revolving inside of a stationary cam of elliptical or similar contour, have those pistons directly actuated by the cam. While there are various applications of stationary cams. there are admittedly the exception. however, rather than the rule.

Reciprocating cams, usually of plate type, are often referred to as sliding cams. They move back and forth, as a rule, between rigid guides or ways, and have an overhanging edge with a curve or a profile that acts directly on the follower. In practically all instances,

these sliding cams are made to travel a straight path for the purpose cited, though it is to be noted that sliding cams may be made to move between concentric circular guides, the cams themselves being in the form of circular segments, and having their guiding edges (though not necessarily their overhanging edges) concentric with one another. There is only an occasional instance where this has any advantages over straight sliding cams, however. It is also worthy of note that cams of sliding type may be made in the form of an endless band or chain, in the general manner in which an endless filing band is made up, in any case where such an arrangement seems better adapted to requirements than the usual reciprocating action of a sliding cam.

Most cams are of rotating type, but rotating cams sub-divide into a number of kinds. Chief among these is the peripheral plate cam, mounted on a cam shaft or arbor. Such a cam usually actuates the follower against the resistance of a spring or a weight, in order that the follower may remain in positive contact with the cam throughout its stroke. In some instances, the weight of the follower itself can be utilized to maintain such contact, especially where the rotation of the cam is slow, in a vertical plane.

A cam follower often (though by no means always) has its path of travel arranged so that, if extended, it would pass through the center of the cam shaft. The fact is, however, that the follower can be made to travel in any predetermined straight or circular path, and the velocity of the follower can be made what one wishes, within all reasonable limits. Various schemes have been used for plotting cam curves, and it is to be noted that the nature of the curve incorporated often has everything to do with the efficiency of the cam. Many cams are made with a curve which gives them what is known as a uniform rise. A uniform-rise cam is

one on which the cam curve departs from the center of rotation at the same rate at all points. Some cams, as for instance screw machine cams of peripheral type, have a number of lobes, and most of these lobes are made with a uniform rise, to provide a uniform feeding action for the cutting tools of the screw machine.

The design of plate cams for screw machines bears a definite relationship to the speed of the work spindle. Both the tool feeding movements and the idle movements must be incorporated and properly interrelated on the cams. On the standard Brown & Sharpe machines, as a case in point, there are three peripheral cams operating, one of which controls the movements of the front cross slide, another the rear cross slide, while the third is the lead or turret governing cam. It is not our purpose to go fully into the design and drawing of these or any other cams, but it may be noted that these particular cams are divided into hundredths, around

Shown herewith is a special machine developed and used by the George L. Detterbeck Co., in cutting Brown & Shorpe, Davenport and Swiss type screw machine peripheral or flat cams. This machine is equipped with attachment gearing which the operator can set in a ratio to produce whatever rise is desired, per hundredth of cam periphery, from .002" to .048". (Photograph courtesy of George L. Detterbeck Company, Inc.)



heir periphery, to make it easy to asign required angular values, in sejuence, to the production of given rejuired motions. Full instructions for aving out cams for their respective mahines are provided by different screw nachine manufacturers. For that reaon, there is no particular point in gong into it deeply here. The same general system of dividing plate cams ingularly is applicable in practically ill plate cam layout, though for very simple cams, relatively few angular livisions are required. On the other and, some who deal with highly acurate cams may have more divisions han one hundred, if desired. There s no set rule in this respect, so cam designers govern themselves according o circumstances in the particular case.

Advances made in the production of peripheral screw machine cams during the last ten or fifteen years, with regard to economy, are very great. Some cams which were made years ago by milling and hand work, requiring a tool maker to spend an entire day or more on one cam, later were produced on profiling machines, by first making a



drawing of the cam, attaching it to a thin, annealed steel sheet, about .030" thick, and cutting this out to serve as a template for guiding the pantograph mechanism, and thus the path of the cutter in machining the cam proper. The template was made twice oversize, to reduce any errors that might have been present in the drawing or template, by half.

However, this method is entirely outmoded, for there are those specializing in furnishing peripheral screw machine cams at the present time, who use a special machine they have developed particularly for this purpose. These machines, cut cams of peripheral type for Brown & Sharpe, Davenport and Swiss type screw machines, and have high accuracy and speed incorporated into the operation. They can produce the completed cam for the Brown & Sharpe machine at a cost slightly above the charge normally made by suppliers of screw machine cam blanks. Attachment gearing, incorporated in the design of this machine is so arranged that the operator can set the machine in a ratio to produce whatever rise per cam space (within the scope or rises from .002" to .048" per hundredth of cam surface or periphery) may be desired. With this in mind, it is far more economical to purchase these cams than it is to make them.

It is, in fact, noteworthy that not only peripheral screw machine cams

Another view of a uniform-rise peripheral cam lobe being generated on a universal milling machine equipped with a vertical milling attachment and a spiral index center. Note that in this case, the angle of the cutter spindle and that of the index head are somewhat more nearly vertical than in the other view. The more nearly vertical the setting, other things being equal, the greater is the value of the rise produced. (Photograph courtesy of Brown & Sharpe Mfg. Co.)



Universal milling machine equipped with a spiral index head for holding and revolving a cam in a rotational speed proportional to the travel of the milling machine table, and also fitted with a vertical milling attachment for holding the milling cutter. Note the spindle of the milling attachment and that of the index head are in parallelism. As the table moves slowly to the left and the cam is revolved at a uniform rate at the same time, it is evident that a uniform rise will be milled on the cam lobe. The cutter is always arranged to cut on the under side of the cam, as this gets rid of the chips produced more rapidly. (Photograph courtesy of Brown & Sharpe Mfg. Co.)

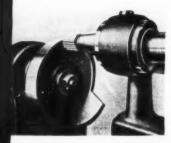
are available on the open market, but that there are those who, making a specialty of providing practically everything needed in connection with screw machine operation, supply cams suitable for attaching to cylindrical cam drums, as well. One such firm in mind provides lead cams, cut off and forming cams, and will also furnish cam rollers and pins having perfect concentricity for screw machine use.

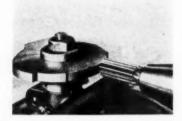
Those acquainted with the Swiss type screw machine, as used in many places, know that in addition to a number of flat cams, a bell cam is employed on some of these machines, where the length of headstock travel is greater than ordinary. It is obvious that cam service for these particular machines. therefore, must include facilities for proper milling of bell cams, as well as flat plate cams. These Swiss type screw machines originated in Switzerland. though there is now a number of American models. One of the leading builders, located in the middle west, uses a special cam milling machine designed for this particular purpose. It will mill both peripheral and bell cams, and cam

service may be obtained either directl from the plan', or from eastern representatives.

The milling machine used has a cam holding mandrel, on which the cam secured by a nut. The mandrel has worm wheel on its other end, and i arranged so it can be adjusted or os cillated through 90 degrees, directl around the axial line of the worm whice engages the worm wheel. Thereby, the worm and the worm wheel are kep in perfect engagement, while the mandrel is set vertical for milling flat cams or set horizontal for milling bell cams as the need may appear. An end milling cutter is used on both kinds o cams.

While screw machine cams employ ing a constant rise or fall have usually been produced by milling, it is eviden that a grinding wheel may be substituted for a milling cutter, and it the mechanical principles involved are observed, a constant rise or fall can be generated on the cam by grinding. The fact is that one manufacturer of Swistype screw machines has a cam grinder that has been developed for the pur-





ere are two close-up views of the cam milling machine which will handle both and bell cams, by tilting the cam spindle into vertical and horizontal positions, spectively. At the left, a bell cam is shown in process of milling on this machine, and at the right, milling of a peripheral cam. The main support of the machine, hich carries the cam spindle, can be set at different angles with the headstock at carries the milling cutter, so the end of the milling cutter will be rightly aligned each case with the particular value of rise being generated on the cam. (Photogaph courtesy of Russell, Holbrook & Henderson, Inc.)

nse of grinding constant-rise perineral screw machine cams. The manine can be used for cams of this kindgardless of the particular screw manine on which they are to be used. is quite simple in design, and easy set up. The company providing this inder also has cam layout and checking gages, as well as degree plates and implates for use in laying out cams poloyed on their own Swiss type rew machines.

While it has been pointed out that niform-rise lobes are the rule on screw achine cams, it is to be remembered at there are many other cams, used n various kinds of machinery, which re of uniform-rise type. In this conection, for those not conversant with ethods employed for generating a uniorm rise on either a screw machine or ther cam at the milling machine, it hay be said that vertical milling atchments are available, for the uniersal miller, that can be set with their utter-carrying spindle at any angle rom vertical to horizontal. Universal piral index heads, for use on the same

milling machine table, can also have their setting vertical, or at any desired angle between that and horizontal. It follows that by using a vertical milling attachment to carry the cutter, and a spiral index head to carry and revolve the cam being milled on its periphery, any angle between horizontal and vertical may be chosen for the "operating angle" on a given cam or cam lobe. When this angle has been determined. both the vertical milling attachment spindle and the spiral and the spiral index head are set to it. In other words. whatever the operating angle chosen, the spindles of the vertical milling attachment and the spiral index center are set in true parallelism.

When the cutter engages the cam, under these conditions, and the table travels the cam toward or from the cutter, revolving the cam at the proper predetermined rate meanwhile, a perfectly uniform rise is generated on the cam. If it be assumed that the spindle setting is vertical, the lead or rise in the cam will be just the same as the lead for which the milling machine



STARRETT

PRECISION TOOLS . DIAL INDICATORS . STEEL TAPES . GROUND FLAT STOCK
HACKSAWS . BAND SAWS FOR CUTTING METAL WOOD PLASTICS

able is geared. If it be assumed, on the ther hand, that the spindle settings are lorizontal, no lead or rise whatever would be produced on the cam. The ise on the cam will therefore vary, as he operating angle is made to vary naking it possible to obtain different rise values with the same table gearing, and the same rotational setting of the piral index head.

The required angle for milling a given rise on a peripheral cam in this manner, or on any part of a cam periphery, can always be calculated, so it is never it rial and error method. One must know the spiral lead for which the nachine is set, that is, the distance he milling machine table will travel, while the spiral index head gives the cam exactly one turn. One multiplies his spiral lead by that part of the pircumference on which it is desired to

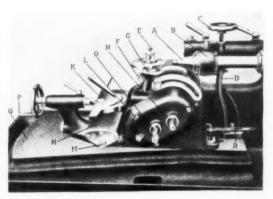
generate the rise, then divides the actual rise it is desired to generate by the factor obtained, and the result is the sine of the angle that must be employed.

As a case in point, assume that it is desired to mill a rise of 43" in 180 degrees or .5 of the cam circumference, and assume the machine and spiral index head are set for a spiral lead of 1.5". Multiplying 1.5 by .5 we obtain .753. Consulting a table or trigonometric functions, we find this to be the sine of 35 degrees and 59 minutes, which means that an angular setting of 35 degrees will be close enough in practically all cases, and will generate exactly the desired rise on a 180 degree cam lobe.

It is believed, however, that it is not even necessary to calculate in this

Shown here is a type of machine which is fully adaptable for milling both peripheral and bell cams for use on screw machines, which is popular for Swiss type screw machine cams due to its ability to mill bell cams. While the headstock portion, carrying the milling cutter, is rigidly fastened to the base of the machine permanently, the main support portion of the machine carrying the cam spindle E can be loosened and moved on the saddle Q to agree with the particular rise being milled on the work, and when properly set, is locked in posi-

tion with the spanner R.
The cam spindle E and its yoke are arranged tiltably, so that spindle may be set horizontal for milling bell cams, or may be set vertical for peripheral cams as in this illustration. This rocking or tilting part F is locked in the chosen one of these two positions by the nut



G. It has its swinging or tilting action directly around the axis of a worm as a pivot, from which worm it receives its movement through a worm wheel. Thus, the worm and worm wheel remain in proper mesh regardless of which one of the two positions is being utilized.

The cam is fed to the milling cutter by means of the hand wheel P, but the

amount of the feed governing the rise produced is determined by a combination of two factors. One of these is the relative lateral speed of the slide H to the rotary speed of the cam. The other is the angle of inclination at which the guide K, mounted atop the slide H, is set. The steeper the inclination of K, the steeper is the rise produced on the cam, and vice versa. Three different ratios in speed between the spindle E and the slide are available through gears manipulated by the rod L. One of these ratios reduces the lateral speed of the slide H very greatly in relationship to the rotary speed of the cam, and allows the guide K to be set at a much stronger angle of inclination. This is highly convenient for very gradual rises, such as those used on cams employed on the screw machine in making clock parts, etc. Angles of the order of 1/2 or 3/4 degree can thus be multiplied, so far as setting the guide K is concerned, to a value of a few degrees, making them much easier to read off in setting the quide.

The rod L is set at three different axial positions for obtaining the three different speed ratios mentioned, and it is possible to set it between two of these positions,

in which case the gears are out of mes and no motion is transmitted from t revolving cam spindle to the screw which traverses the slide H. Thus, t slide and its mounted guide remain st tionary, and continued turning of toam spindle will generate a portion the cam perfectly concentric with teenter of rotation, as is required in a case where a rest or dwell must be i corporated into the cam.

Cutter spindle A revolves in two bron: bearings in the headstock B, and th headstock can be raised or lowered I the handwheel C, to set the cutter proper height for bell cams of differen diameters. Before milling begins, th headstock B is rigidly locked against th support D. The actual rotation of th cam spindle E is by means of a cran which is fitted on the spindle N f ratios 1 and 2, and on the spindle O fe ratio 3. Flat cams having a minimum diameter of 1.37", and a maximum die meter of 9.84" can be milled. Bell cam from there to a maximum of 7.87" ca with a minimum diameter of 2.75". be machined. The maximum height of bell cam that can be handled is 7.08' (Photo courtesy of Russell, Holbrook Henderson, Inc.)

manner at milling machines where very much cam milling is done in this way, in many instances. Some milling machine manufacturers, that supply spiral index heads and accompanying change gears for their own machines, have complied tables in terms of their various standard change gears, and in terms of the cam lead or rise, as it would be if produced over the entire 360degree periphery. In the case before cited, using such a table, one would merely multiply the desired .43" rise by 360/180, or 2, to find that it would be equal to .86" if the same rise were to be milled over the entire circumference. Running the table until this value of .86" is found, there would be listed behind it the different change gears to be used, and also the angular setting

to be employed, to produce the desire rise on the cam. In the absence of such a table, of course, one can tabulate such data for himself, in relation ship to the milling of any specific car rises that chance to be standard in given plant. End of part 1.

SOUTH BEND

New Adjustable Collet Bushing Chuck provides an accurate method for mounting center.

accurate method for mounting centerless armature shafts and similar parts in a lathe. Use in either head or tail spin-



dle. The brass collets are adjustable for running or driving fits. Chucks supplied with 3 collets: 9/16", 5/8", and .637" capacity. Extra round collets, 1/4" to 1" by 16th, 5,100 each. Chuck with No. 2 shank \$8.95 Chuck with No. 3 shank \$9,45

SOUTH BEND LATHE WORKS South Henri 22-In

The Backbone of Cost Saving Dimensional Control



THE VISUAL GAGE

is an indicating comparator set by means of precision gage blocks for checking external dimensions, the angularity of surfaces, the angularity between a bore and a surface, run-out, and the pitch diameter of screw threads. It is both a production and a tool room instrument. Write for catalog.



you are manufacturing mechaniil elements, close dimensional conol will save you assembly time ecause accurately sized parts fit toether quickly. Applied directly at the machine, proper gages save you crap losses and much machine me. When all the elements of a techanical assembly are held actrately within tolerance, that as-

sembly gives superior performance in service.

Around Sheffield instruments and gages have been developed some of the most effective dimensional quality control policies in the manufacturing field. Let us send you descriptive literature on cost saving equipment—it may lead to solving your inspection problems.



STANDARD GAGES

heffield can supply ny type of standard or ixed size gage and a vide range indicating ages for shop checking. Sheffield's principal products include Gages, Measuring Instruments, Machine Tools, Threading Tools and Contract Services. Standard Gages shipped within 24 hours.



MACHINE SHOPS

Jave Time and Labor

WITH FORK-LIFT TRUCKS



by Francis A. Westbrook

Labor costs can be greatly reduced, floor space saved and production upped through the use of efficient materials handling equipment. Several interesting applications are here described.

HE USE of gasoline powered fork-lift truck have saved floor space and manpower and speede production in many plants. At the Cleveland Gra phite Bronze Company seven units are in service. Of one job of storing raw materials in the strip mill fiv men and two lift trucks replace 21 men who previousl performed the same operation manually.

In the receiving department of the Warner Gea Division, Borg-Warner Corporation, one truck, with its operator, performs the work of a ten-man gang Total operating cost of the machine is only one-quarte the wages of the operator.

To appreciate fully what can be accomplished with this type of handling equipment, let us consider briefly a few specific applications. At the plant of the Warne Gear Division it is necessary to move large quantities of materials from the receiving department to storage and to production departments. In addition parts must be moved, on schedule, from one production operation to another; finished products must be taken to storage and stacked. An average of 125 tonof finished gears have to be handled through the shipping department daily. All this means handling a wide



g. 1 Miscellaneous castings are moved the production department of the farner Gear Division.



Fig. 2 Gear blanks are transported from lathe to the gear department. Two trucks are used to facilitate movement of materials.

ariety of shapes, weights and sizes, icluding special racks, tote boxes, kids, pallets, and so forth.

In the receiving department, referred by above, the fork-lift truck is used to sull its load to the rear of a motor truck or box car with a chain and then lift off he load by means of its fork and carry to its destination without rehandling. At this plant there are no ramps leading up to a loading or receiving dock. The ruck also handles bar steel 18 feet ong, taking it to the storage racks and later delivering it to production lepartments without loss of time. The pasy maneuverability of these trucks enders them highly suitable for such vork.

An unusual job for which these trucks are used in this plant is for moving yanide pots weighing 1200 pounds from the heat treating department to storage. Another is to transport 16 transmission assemblies in one load, four to a skid, and weighing 5600 pounds.

In the storage section the fork-lift trucks are particularly helpful in stacking materials to conserve floor space. Pallet loads of bolt kegs are stacked five or six high and frequently as many as eight 400-pound boxes of gears are piled on a pallet and stacked three high.

Two trucks are used in the shops for such jobs as delivering loads of castings (Fig. 1) from storage to production departments, taking a load of gearsblanks from the the lathe department to the gear department (Fig. 2), and then taking the completed gears, stacked on racks (Fig. 3), to finished stores. Two other trucks work in the shipping department where they load motor trucks and box cars from ground level. Several railroad cars and 12 to 15 trucks are loaded daily in this manner. In addition to this some 52 tons of scrap are handled by the trucks per eighthour day. The scrap is carried into the yard in boxes and dumped by means of the forks into motor trucks waiting to carry it away.

At the Cleveland Graphite Bronze Company plant the conditions are different because there are several buildings connected by underground tunnels with ramps at each end having 10 and 12% grades. The fork-lift trucks carry loads of three tons safely up and down these grades without delay.

At this company, it is essential to provide quick transportation between the strip mill and the other buildings, to load or unload trucks and railway cars and to move materials between



DUPLICATION

-an important advantage of

S.S.WHITE FLEXIBLE SHAFTS

Success of a flexible shaft application depends principally on selecting the shaft with the right characteristics for the conditions and requirements of the application.

Once this is done and the application goes into production, continued success depends on getting shafts which are "carbon copies" of the original in characteristics.

With S.S. White flexible shafts you can count on exact duplication becouse:

1. Special machines, developed by S.S. White engineers, faithfully reproduce the specified characteristics in every foot of shafting.

2. S.S. White's strict adherence to original specifications insures that no change is ever made in grade of wire or construction

The assurance of exact duplication is one big reason why so many flexible shaft users have found it pays to get S.S. White flexible shafts.

FLEXIBLE SHAFT HANDBOOK -FREE TO ENGINEERS

Contains full information and technical data about flexible shafts and how to select and apply them. Copy free, if you write for it on your business letterhead and mention your position.

DEPT. H 10 EAST 40th ST., NEW YORK 16, N. Y .-



PLEATELE CHAPTE . FLEXIBLE SHAFT TOOLS . AIRCRAFT ACCESSORIES SMALL CUTTING AND GRINDING TOOLS . SPECIAL FORMULA BUBBLESS
MIGLDED RESISTORS . PLASTIC SPECIALTIES . CONTRACT PLASTICS MOLDING

One of America's AAAA Industrial Enterprises

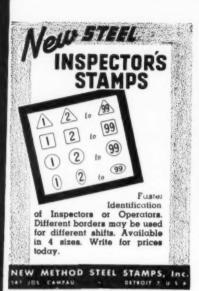




Fig. 3 A fork-lift truck is used at the Warner Division to handle racks of finshed gears.. This truck is transporting finished gears to the finished stores.

various production operations. Most of the materials are in metal tote boxes. Quite long distances are involved and much of the travel is over comparatively rough flooring. The steel strip and tubing which is handled is frequently as much as 15 feet long. These service conditions, of course, mean that the trucks must have the requisite power.

The steel tote boxes, of which several thousands are in use, are stacked six to eight high in the storage areas by means of the lift forks, in order to make use of all available space. In one instance, the introduction of the forklift trucks increased storage capacity threefold. In the strip mill they are used to unload freight cars and to tier containers of ingots weighing 5000 pounds five times higher than was formerly possible by manual handling. Copper and steel strips are also tiered in bundles.

When unloading motor trucks at the



LITTELL Air-Blast Valve automatically ejects LITELL AIT-usat Vaive automatically ejects pieces from punch presses. Keeps operator's hand out of danger zone. Increases safety and speed. Air nozzle quickly adjustable. Other Littell safety devices include Pres-Vac Safety Feeders for picking up and feeding flat-

surfaced materials; also, air-operated Mechanical Pickers for feeding pieces that vacuum lift will not pick up.

Littell makes a complete line of Automatic Reels, Feeds, Straighteners, Scrap Cutters, etc. BULLETINS

J. LITTELL MACHINE 4153 Ravenswood Ave., Chicago 13, III.



Fig. 4. Red hot rings are being removed from the furnace, and by means of a fork-lift truck taken to the sizer.



Fig. 5. The hed hot rings are being placed on the sizer with the fork-lift truck. After this operation the ring is carried to a press.

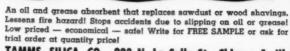
neceiving station, the lift trucks often handle heavy machine tools and other equipment, moving them directly to their designated location in the plant in a single operation. More and more materials are today being shipped and received on pallets; the use of forklift trucks thus increase the handling efficiency.

The trucks are used for a variety of incidental work around the plant, such as changing heavy dies on the presses, and lifting and moving heavy tube. They are used for other tasks calling for accurate maneuvering. Routine handling is carried out according to regular schedules on established routes.

It is an interesting fact that although most of the handling by the fork-iift trucks comes under the classification of fast heavy internal transportation, the experience of this company has shown that women operators are just as efficient as men. The average cost of operation, maintenance, depreciation, etc., of these trucks indicates an efficiency ratic as compared to manual handling of $3\frac{1}{4}$: 1, in this plant.

The versatility of this type of mechanical handling equipment is well, illustrated by the use made of it by the American Welding and Manufacturing Company. Fork-lift trucks were primarily employed by this company in connection with the production of alloy steel turret rings seven feet in diameter for military tanks. Each ring weighs 800 pounds and must be picked up after flash welding which is done on the forks of the truck, and placed

OILY FLOOR TROUBLES STOPPED with FULLERS EARTH!



TAMMS SILICA CO., 228 N. La Salle St., Chicago 1, III.

in a furnace where it is heated to 1200 degrees F.

After heating, the ring is removed from the furnace by attaching a grappling hook and, with the truck, pulling it to the lip of the furnace. The red hot ring is then removed from the furnace on the forks (Fig. 4) and carried 30 to 50 feet and placed on the sizer, or expander. To do this the operator runs the truck very closely to the sizer, low-

CASTINGS

QUALITY, APPEARANCE & PRICE
Write or Phone

ARCANUM ALUMINUM FDY. 8430 Grand River Ave. TY 7-6733, Detroit 4, Mich.



ers the forks so that the ring hooks over the far side and then backs away to permit the ring to drop into position (Fig. 5). It is next picked up and carried 30 feet to the flattening press where it is again maneuvered into position between the narrows jaws of the press, which applies a pressure of 500 tons to the still red hot ring. The particular feature here is that the whole sequence of operations from furnace to flattening press must be done in not much more than one minute to avoid returning the rings to the furnace for reheating. Actually the average time for the three operations is 67.8 seconds. The final operation in this sequence performed by the truck is to remove the ring from the flattening press and place it horizontally on the inspection pile.

This ring handling sequence is not a continuous process, but takes place only when the furnace is being loaded and unloaded. During the heating period the trucks are available for other purposes. At such times they are ε mployed for numerous heavy lifting, transporting and stacking jobs around the plant thus, by their versatility, decreasing costs all around. THE END. (Photographs Courtesy Tow-Motor Corp.)

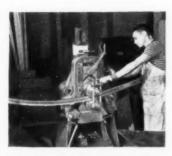
DIE CUT PARTS

Photograph of parts produced occupies one page. Temporary arrangement for renting their stock of standard tools is explained. 4 pages. WLS Stamping Co., 3290 East 80th St., Cleveland 4, Ohio.

CAST BRONZE BEARING

The catalog is divided into three sections: Standard Stock Bearing Bars; Electric Motor Bearings; and Design and Engineering. Gives listings, and engineering information on the installation of bearings, recommended table of press fits, instructions for groooving and selection of proper type of groove, etc. 58 pages. The Bunting Brass & Bronze Co., Dept. BB, Toledo 9, Ohio.

Put BENDING







Bending of light segments into arcs, spirals or circles NEED NOT BE EXPENSIVE! More and more manufacturers are discovering the BEST way to get bending cost down — and that is with "Buffalo" OA Bending Rolls.

With an OA, you can take angles, squares, rounds and structural shapes — and bend them accurately into scores of useful curved products — with a speed you won't believe until you have actually seen it! DON'T LET BENDING PUT A "CRIMP" INTO YOUR PRODUCTION — investigate what "Buffalo" can do for you — write now for all data on "Buffalo" Benders!

BUFFALO FORGE COMPANY

161 Mortimer St.

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd. Kitchener, Ontario







U.S.S CARILLOY STEELS

You can get prompt shipments of AISI alloy steels from our large warehouse stocks. U·S·S Carilloy Steels in our stock are manufactured to a Guaranteed Minimum Hardenability. A Heat Treatment Guide is supplied with each shipment . . . assuring the steel's Guaranteed Minimum Hardenability.

But there is an additional advantage when you order U·S·S Carillov Steels: Our metallurgical

service supplies you with complete and specific information on the steel you receive with each shipment. Thus you get specific data on the composition, potential physical properties and fabrication of the steel you buy to assist you in obtaining maximum performance.

These are some of the reasons why our stocks of U·S·S Carilloy Steels will best serve your alloy requirements. Contact our ware-house nearest you for quick service.

UNITED STATES STEEL SUPPLY COMPANY

BALTIMORE · BOSTON · CHICAGO · CLEVELAND · LOS ANGELES MILWAUKEE · NEWARK · PITTSBURGH · ST. LOUIS · TWIN CITY (St. Paul)

UNITED STATES STEEL

ACCURATE MACHINING OF EXTERNAL AND INTERNAL

Straight-sided Splines



by Douglas T. Hamilton Fellows Gear Shaper Company

A forming process can be used to produce straight-side splines without leaving a fillet at the bottom of the spline. Equipment necessary and method of application are discussed by the author. Types of cutters used for external splines are described, as well as methods of aligning cutter with the work.

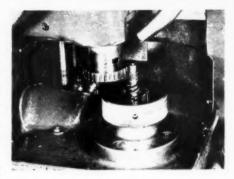
T WO DISTINCT forms of splines are in general use. One is known as involute splines, and the other as straight-sided splines. Involute splines are simply shortened gear teeth, and as such can be produced in a similar manner. Straight-sided splines, however, present a different problem if the same degree of inter-changeable accuracy is desired between the external and internal splined parts.

Straight-sided splines can be generated, but the generating tool invariably leaves a fillet at the bottom of the splines, and if this is objectionable, then they must be produced by a forming process.

Several methods are used for this purpose, and the following covers a special type of Gear Shaper and cutters for this purpose. The Gear Shaper, as shown in Fig. 1, is arranged with an indexing fixture, and is provided with electrical control for automatically operating the indexing mechanism. A close view of this indexing mechanism with the work-holding fixture removed to expose the operating mechanism is illustrated in Fig. 2. The operation of this device is as follows: Compressed air from the "line" passes through a four-way solenoid air valve A, Fig. 3, located at the rear of the machine. This air valve is

connected to the electrical control equipment. The air is transmitted from valve A through pipes to cylinder B, Fig. 2. The rack plunger R in cylinder B meshes with gears, which drive pinion C engaging gear D. Gear D, which is free to float around the work-spindle, operates the indexing mechanism.

A cam, integral with gear D, operates lever E, which through



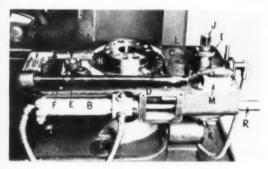
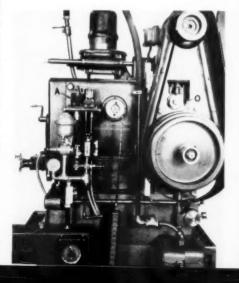


Fig. 1. (Top). Close view of Fellows 7-Type Gear Shaper showing arrangement for cutting external splines on an indexing attachment. Fig. 2 (Left). Work-holding fixture removed to show operating members of indexing mechanism. Fig. 3 (Bottom). Rear view of machine showing air valve, automatic indexing counter and part of electrical control equipment.

gear F, withdraws plunger G from contact with index plate H. As soon as index plunger G is withdrawn, a pawl carried on gear D engages with rack teeth integral with plate H, and this, in turn, rotates the index plate the desired amount. The angle of rotation can be changed by adjusting the stroke of air cylinder B. This is accomplished by releasing nut I and turning shaft J to the desired number of indexes on plate K. Shaft J carries a cam L. which opeates micro-switch M. Switch N is a safety switch, operated by cam dog L, which automatically stops the machine if indexing is not completed. Switch M through a solenoid, operates four-way air valve A. Fig. 3.

The cutter is advanced towards



the work by a special depth-feed cam in the usual manner. This cam, however, may have one or more lobes depending on the number of spline grooves to be cut. Located on the rear end of the depth feed shaft a switch cam O, Fig. 3, which has the same number of slots as the depth feed cam has lobes. This is connected to the electrical control equipment and a micro-flex "counter" P. The micro-flex "counter" is set for the number of spline grooves in the work.

The operation of this automatic indexing mechanism is as follows: When the start push button on the machine is depressed, the motor starter is energized, the "counter" circuit closed, and the brake on the motor de-energized. The cutter-spindle starts reciprocating, and the depth-feed cam advances the cutter into the work. The electric switch cam O, on the rear end of the depth-feed camshaft also rotates and denergizes he circuit to the indexing mechanism.

After the depth-feed cam has advanced the cutter to the required depth. continued rotation of this cam causes the roll to drop into the depression in the cam and withdraws the cutter from the work. The switch on the depth-feed cam shaft then closes, energizing the "counter," and the solenoid, which admits air into the cylinder causing the piston to move to the left. As the piston reaches the end of its stroke, the "micro-swich" opens, de-energizing the solenoid. This admits air into the lefthand end of the cylinder and moves the piston to the right, completing the indexing. Continuous rotation of the depth-feed cam and electric switch cam O, causes this sequence to be repeated until all of the spline grooves in the work have been completed. Upon the completion of each index of the work, the electric switch cam O, operates the "counter", and causes it to "ratchet" one count. The "counter" automatically

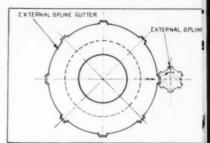


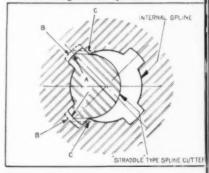
Fig. 4. Diagram illustrating how depth of spline groove affects the design of "straddle"-type cutter.

re-sets to zero when the work has made one complete revolution, and starts from zero on the next piece.

Types of Cutters Used For External Splines

For cutting external splines, the cutter is usually made circular in shape, as shown in Fig. 4, with a number of spline teeth equally spaced around its circumference. Only one spline tooth on the cutter, however, is used at one time, and when each tooth on the cutter becomes dull, the cutter is indexed

Fig. 5. Type of cutter used in cutting external straight-sided splines.



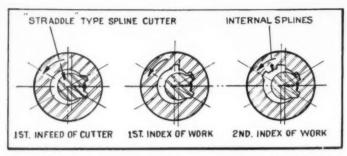


Fig. 6. Sequence of operations in cutting internal splines with a "straddle"-type cutter.

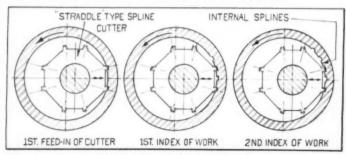
to bring another spline tooth into action, until all of the teeth are dull. The cutter is then removed and resharpened. Re-sharpening of the cutter does not affect the width of the spline, because as the cutter is reduced in diameter by re-sharpening it is fed in deeper.

The cutting of internal splines presents a more difficult problem, especially when the hole in the work is small and there are a comparatively small number of splines. A single-point cutting tool presents disadvantages in that re-sharpening reduces its

width and therefore it has a comparatively short useful life.

A new type of cutter known as the "straddle-type" eliminates this objection, but there are certain design factors which must be taken into consideration. These are shown diagrammatically in Fig. 5. It will be noted that the cutting portions of this cutter "straddle" the spline, and as the portion of the spline teeth on the cutter at A must be slightly greater in width than one-half the width of the spline groove produced, the depth of the spline groove is therefore limited. For instance, in this

Fig. 7. "Straddle"-type used for cutting splines in large holes.



PRACTICALLY INDESTRUCTIBLE

ACME BENCH VISES — Ruggedly Built Precision Made offer you



Longer Vise Life
Maximum Gripping Power
No Side Twist or Wobbling
Unbreakable Sleeve Nut
Interchangeable Ground Jaws.
11 Sizes from 2" to 6"

Vise Head and Nut Castings are Malleable Iron; other parts are high tensile Semi-Steel Castings. Makes them practically indestructible.

DEPENDABLE ACCURACY!

INSPECTION TOOLS made of MEEHA-NITE Metal are designed to fill your various Inspection and Checking needs in the Inspection, Tool Room and Production Departments. Sturdily constructed to give you reliable, accurate service.

Surface Plates Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels Lapping Plates
Toolmakers' Knees
Straight Edges



Write for Literature . . . Prompt Delivery



particular case, if the spline groove was increased in depth to the dotted line **B**, the cutter in feeding into depth would cu away a portion of the succeeding splines as indicated by the dotted lines at **C**. Obviously this condition can be avoided, either by limiting the depth of the spline grooves, or increasing the number of splines.

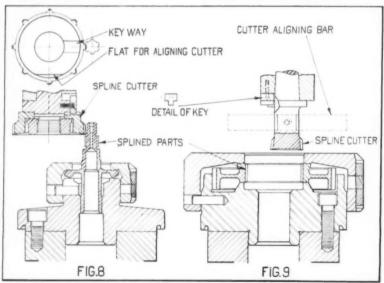
Fig. 6 shows the cutting sequence of the "straddle" type cutter. It will be noticed that a spline groove is not completed until the work has made one index, and that only one side of the spline teeth on the cutter finish the spline grooves. Obviously, resharpening of the cutter and consequent reduction of the tooth thickness does not reduce the width of the spline groove produced, as would be the case

with a single-tooth cutter. The sides of the spline teeth on the "straddle" type cutter have approximately the same relative clearance angle as the outside angle, so that spline groove width can be maintained by simply feeding the cutter in deeper.

When the hole in the work is of larger diameter, and where there are a greater number of splines, the cutter is made in the form shown in Fig. 7. This cutter is also of the "straddle" type, but as will be noticed, in the first "feedin" it overlaps one spline groove, this being "roughed" out in the first index. It takes two indexes of the work before one spline groove is completed. This type of cutter has the same advantages from the standpoint of maintaining groove width, as is the case with the

Fig. 8. Diagram illustrating method of aligning cutter when cutting external straight-sided splines.

Fig. 9. Diagram illustrating method of aligning shank-type cutter when cutting internal straight-sided splines.



cutter show. in Fig. 6. It will also be noted in Fig. 7 that the cutter is made with eight-teeth, but, of course, only two teeth are used at a time. When these become dull, the cutter is indexed one-quarter of a revolution, and another group of teeth brought into action. This procedure is repeated until all the teeth are dull, when the cutter is removed and re-sharpened.

Aligning Cutter With the Work

Another factor in connection with the production of interchangeable parts, is the alignment of the cutter to the work. This is especially important when the splines must bear a definite relationship to some other locating point. Figs. 8 and 9 illustrate a means for aligning cutters for cutting both external and internal splines. Fig. 8 shows one method for aligning the cutter for cutting external splines. A flat surface is ground on the hub of the cutter. The cutter is also provided with a keyway in which a mating key on the

cutter-spindle fits. When the flat surface on the cutter is aligned parallel with the rail on which the saddle is held, the cutter is then located in the desired position on the cutter-spindle, and can be removed and replaced without disturbing its relative position. In some cases gages are also employed.

A method for aligning shank-type cutter for cutting internal splines is shown in Fig. 9. The flange on the cutter is provided with a slot in which a key attached to the cutter-spindle fits. A flat is also provided on the shank of the cutter in a definite relationship to the slot in the flange. In this case, the two surfaces are parallel. To locate the cutter, a straight bar-shown in dotted outline-is clamped to the cutter. and this bar is aligned parallel to the saddle rail on the machine. In this case the cutter can also be removed and replaced without disturbing its relative position. Figs. 8 and 9 also show two typical types of work-holding fixtures for holding parts on which external and internal splines are cut. THE END.

CHICAGO PRODUCTION SHOW OFFERS SPACE FOR 140 EXHIBITORS

Plans for the 1948 Chicago Production Show of March 22, 23, 24, at the Stevens Hotel, have been announced by Paul A. Jenkins, executive secretary of the Chicago Technical Societies Council, sponsor of the Show and of the concurrent Chicago Technical Conference.

Attendance at the Conference next March is expected to reach 10,000; attendance at the concurrent Show is expected to exceed 25,000. These twin events are an outgrowth of the War Production Clinics inaugurated in 1943 by the War Production Board in major cities of the United States.

Attended largely by production executives of Chicago and the Middle West, the Chicago Production Show is an annual exhibit of materials, tools, instruments, handling equipment, and services designed to increase production volume and decrease production costs.

As in previous years, the 1948 Chicago Production Show will accommodate about 140 exhibitors. Booth space is now being offered and firms desiring to participate may direct their inquiries to Mr. Jenkins at the Chicago Technical Societies Council, 53 West Jackson Boulevard, Chicago 4, Illinois.

PRESSED METAL INSTITUTE PLANS FEBRUARY MEETING

The annual meeting of the Pressed Metal Institute (Union Commerce Bldg., Cleveland, 14, Ohio) will be held February 10 and 11, 1948, Hotel Statler, Buffalo, N.Y.

In announcing this meeting, Tom J. Smith Jr., President of the Institute, stated that the two day meeting would be devoted to reports of officers and committee chairmen, election of Trustees and officers and four programs of especial interest to management and stamping engineers.

Sam Morrison, Vice President Morrison Steel Products Inc., Buffalo, N. Y., is Chairman of the Annaul Meeting Committee.





● Cut down your drill cost with this self-energizing chuck —the harder the drill works the tighter it grabs, eliminates slipping that ruins drill shanks. Sizes up to %"—for drill press, lathe, portable drill.

Ask your nearest Mill Supply House or Mail the coupon TODAY for Bulletin.

R. O. Lee Co			ndeen, S	io. Dak
Please sen describing "I	d us t	he illus	trated	bulletin
Name				*****
Address	_			
City		State		

NATIONAL APPLIED MATHEMATICS

A federal center of applied mathematics—the National Applied Mathematics Laboratories—has been established as a division of the National Bureau of Standards, according to an announcement by Dr. E. U. Condon, Director of the Bureau.

LABORATORIES ESTABLISHED

Organized to conduct research and provide services in the field of applied mathematics, the new organization is oriented around modern mathematical statistics as applied to the physical and engineering sciences and to the develop-

ment and use of modern high speed computing. Applied Mathematics Laboratories include four sepalaboratories: rate the Institute of Numerical Analysis; the Computation Laboratory; the Statistical Engineering laboratory; the Statisti-cal Engineering Laboratory: and the Machine Development Labora-

The concept of such a center originated in 1946 in what is now the Office of Naval Research when it became apparent that there was a strong need for a centralized national computation facility, not only equipped with highspeed computing machinery, but able to contribute to the development of such equipment. Further cooperative study between the Bureau of Standards and the Office of Naval Research indicated that an organization wider in scope than a national computation center was needed. development of

high-speed tools for computation, for example, carried with it an obligation to perform research and conduct training in the theory and disciplines needed for the most effective use of these tools. From the standpoint of both government and private research and industrial processes, the final aim of such a center is to provide the economies and introduce the efficiencies which are possible when relatively inexpensive calculating is substituted for expensive trial-and-error experimentation. The work is carried on with the advice of the Applied Mathe-

matics Council.

ATLANTA, GA., IS SITE OF THIRD SOUTHERN MACHINERY AND METALS **EXPOSITION**

The third Southern Machinery and Metals Exposition will be held in the Atlanta Municipal Auditorium, April 5, 6, 7 and 8, 1948. Exhibitors for the 1948 Exposition will come from coast to coast, and from the Great Lakes to the Gulf. Many Southern companies, as well as na-tional organizations, will be included. More than half of the space has been

reserved by past exhibitors. Requests for exhibit space have already been received from companies who had sent personnel to observe the 1947 Exposition. A number of these concerns are located in the South, while others are located in various parts of the country-Oregon to New York.

Manufacturers of machinery and tools: metal products; materials handling equipment; oils and lubricants: welding and safety equipment; ferrous and nonferrous castings and forgings; electronic apparatus; chemicals and detergents will exhibit their products. Lathes, saws, presses, drills and a variety of industrial equipment used in Southern plants will also be shown. The steel industry will be represented with outstanding exhibits by some of the leading companies.

Southern industrial personnel attending the Exposition will include company executives and plant owners; foremen and supervisors; engineers, metallurgists, inspectors and chemists; purchasing agents, plant managers, technical, skilled

and shop personnel.

The 1947 Southern Machinery and Metals Exposition was judged eminently successful and has been recognized as a moving force in the development of Southern industrial markets. This Exposition has become a focal point in contacting Southern industrial personnel.

Officers of the 1948 Southern Machinery and Metals Exposition are: President. ery and Metals Exposition are: President, Alva S. Wilson, Vice-President of the Auto-Soler Co.; Vice-President, Russell E. Bobbitt, Jr., Chief Engineer, Atlantic Steel Co.; Treasurer, deWitt H. Gunsolus, Combustion Engineer; and Secretary, Michael F. Wiedl, Jr., Michael F. Wiedl & Associates. (The aforementioned officers are also officers of the Georgia Chapter, American Society for Metals, i.e., Chairman, Vice-Chairman, Treasurer and Secretary, respectively.)

Michael F. Wiedl, Jr., of Michael F.

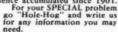
Wiedl & Associates, has been named Managing Director of the Southern Machinery and Metals Exposition for the

third successive year.



- * At greater Man-Hour SAVINGS
- * At higher rated EFFICIENCY
- * At finer, effortless PRECISION

A Moline Multiple Spindle Specially Designed Machine Tool can do your job better at less cost. Ruggedly built to fit your INDIVIDUAL requirements in such operations as Boring—Straight Line Drilling—Universal Adjustable Spindle Drilling—Honing—Tapping—Reaming—Counterboring—Special Milling—these machines are based on years of experience accumulated since 1901.



No. HUGS DRILLER





COMPRESSED AIR AND President Tooks SPEED PRODUCTION



Plant Engineer, Ryan Aeronautical Co., San Diego, Cal.

The substitution of air for manual labor will reduce labor cost and, in many instances, speed up a particular operation. The use of compressed air as used in one plant, with the aid of pneumatic power tools is here described.

M ETAL WORKING plants are becoming increasingly aware of the almost countless number of small and important operations which can be accomplished most effectively and economically with the aid of compressed air. A tour through the Ryan Aeronautical Company provides ample evidence of the contribution of this versatile power toward reducing production costs. Compressed air is used to perform some tasks which would be impossible or impracticable otherwise. Our first stop on the plant tour is at the compressor plant. Figs. 1 and 2.

At the Ryan plant, in San Diego, we have three single-stage air compressors of 325 cubic feet per minute capacity each at 100 pounds per square inch pressure. Each of these units is driven by a 60 horsepower motor. A fourth unit, located in another area than the units shown in Fig. 1, has a capacity of 900 cubic feet per minute. It is a two-stage compressor driven by a 175-hosepower synchronous motor. This total capacity of over 1800 cubic feet per minute is supplemented by a few small air compressors in different areas.

Main lines are of 3 and 4-inch diameter and laterals

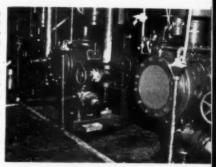
Fig. 1—This battery of three single-stage air compressors supplies approximately one-half of the Ryan Aeronautical Company's compressed air requirements. Each unit is driven by a 60-horsepower motor.

are of 2 and 2½-inch size to supply air outlets at 25-foot centers. These pipe sizes are more than sufficient to assure the minimum pressure drop between the receiver and the point of use. All piping is arranged to slope toward a moisture trap to prevent Carryover of moisture to the tool. Drainage pots are located at all low points and filters are used throughout the plant. The two principal air compossible to the load centers. Their location reduces excessive piping without sacrificing benefits of unified operations and care.

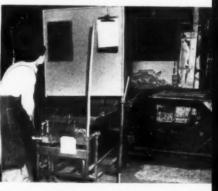
Fig. 2—This two-stage air compressor has 1800 cubic feet per minute capacity, is driven by a 175-horsepower synchronous motor.

Fig. 3 illustrates an interesting application for compressed air from the described compressor plant. Here the door to the heating furnace is raised and lowered by compressed air and the loading table also is raised and lowered by compressed air. The exact flexibility of compressed air and the ease with which it can be controlled proves to be of tremendous assistance to the operator of the furnace. The airplane exhaust system parts load can be easily managed with a slight raising here and a lowering there as it comes out of the furnace door. It is also possible to use a lighter tray for the work because of

Fig. 3.—The loading table for this heat treating furnace is controlled by the operator through an air piston which raises or lowers the table to the exact degree desired. Door to the furnace is also raised and lowered by compressed air.







DEVELOPED TO SAVE YOU MONEY

THE NEW NO. 5 CUTTER AND TOOL GRINDING MACHINE

UNIQUE FEATURES

- Double-ended ball bearing wheel spindle (super-precision, permanentlysealed, grease-lubricated bearings).
- √ Ingenious roller-bearing table
- √ 4-location table crank or knob
- √ Hollow, one-piece base, mounted on 3
 points to preserve alignment
- √ Money-saving attachments

Centers swing 6\%" in diameter. Maximum longitudinal table travel, 6". Distance center line of work to center of wheel spindle, greatest 8\%", least, 1\%". Distance, center of wheel spindle to top of table, greatest, 6\%", least 1\%". Write for specifications, Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BROWN

દ

ON CUTTER AND TOOL GRINDING

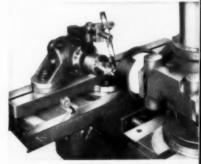
NEW OPPORTUNITIES

Unusually flexible and handy in size, the new No. 5 Cutter and Tool Grinding Machine simplifies and speeds up cutter and tool

sharpening. It is specifically designed to improve tool room efficiency in sharpening all types of small cutters, especially end mills.

SAVE ON SET-UPS

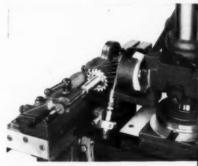
The super-sensitive operation of this machine makes set-ups and operation exceptionally fast and easy. It is the result of an ingeniously-designed table which slides on precision-ground rolls...plus lighter weight parts, engineered for fast and accurate sharpening.



Sharpening End Teeth of Spiral End Mill

SAVE ON FLOOR SPACE AND INVESTMENT

For a moderate investment, the No. 5 Machine will do much of the work that has been done frequently on larger, more expensive machines. On the basis of smaller overhead and space alone, it will reduce the unit cost of sharpening many cutters and tools.



Sharpening Plain Milling Cutter

SHARPE



the compressed air control. Finger tip control of the furnace door and loading tray lessens handling time and makes a 'iresome job considerably less difficult.

Here at Ryan we make stainless steel products, such as exhaust systems for reciprocating engines, certain assemblies for jet engines. Its commercial products include stainless steel and

Fig. 5—Spot welders' production is vastly increased because of the simple, positive action of an air piston for positioning of 'he welding.



Fig. 4—Grinding the weld of a bronze casket is done faster and with less fatigue to the operator by the use of a lightweight, powerful pneumatic grinder.

bronze casket shells. Wherever portable tools are required in this work, compressed air usually is the power specified. This is due to the ease of handling pneumatic tools.

Air impact wrenches for driving studs, grinders for the large amount of welding done in the plant, air drills and similar pneumatic tools are used. The grinding of the weld of a bronze casket, Fig.. 4, and the polishing work at a later stage in assembly are two all-day jobs on which production is greatly improved by the application of pneumatic tools. Heavier tools, which we would need if other power were used, would increase worker fatigue and slow down production. Added

Fig. 6—An air-expanded mandrel is used to shape an exhaust part in the quickest, most accurate way.



Fig. 7—Numbering of round parts is a simple process when an air-expanded mandrel is used and the part then rolled against the die.

power and variable speeds of the tools used also are responsible for better output.

The high finish desirable for the bronze caskets is obtained by spraying of lacquer and here as with all other painting work in our plant, compressed air spray guns are used.

Welding of metal parts is one of the major operations at Ryan and virtually all of the welding machines employ compressed air for holding the electrode in place and positioning the work. Fig. 5 shows a typical spot welding job where an air piston is an integral part of the operation.

Air-expanded mandrels are used in a number of ways to better production. Fig. 6 shows one in use for forming an

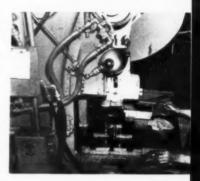
Fig. 8—Both hands on air levers at the same time are required to trip this press. That is a safety measure.

exhaust pipe part. To do this work by mechanical means would be more complicated and time consuming as well as requiring costlier equipment with more moving parts; furthermore, maintenance cost would increase. Another use for an air-expanded mandrel is found on the numbering machine, Fig. 7. Because all exhaust parts must be numbered, the quick, simple way to do it on tubular picces is to place them over the mandrel and roll by hand against the die.

The all-important matter of plant safety gets assistance from compressed

Fig. 9—Sandblasting of heat-treated parts is an important operation at the Ryan plant, using approximately one-third of the total compressed air capacity.







air as do many other metal working plants in the country. Fig. 8 shows how our punch presses can be tripped only when the operator actuates the trip on air levers with both hands at once. The worker cannot forget to yank a hand out of harm's way in time.

Sand blasting of heat treated parts requires approximately one-third of the plant's total compressed capacity. The quick, effective method of cleaning and smoothing metal parts, Fig. 9, saves the company countless hours on this essential operation.

Compressed air is used for agitating liquids. A vacuum pump is applied on one of our secret processes for another air application. And there are many other ways in which compressed air is being applied in the interest of lowering costs and improving production. THE END.

(The author thanks the Compressed Air and Gas Institute for help in preparing this material, and for their assistance in obtaining photographs.)

ARSENEAU-PRICE ENTER CHUCKING REAMER FIELD

The Arseneau-Price Company 10840 East Warren Ave., Detroit 13, Mich., an nounce their entry into the field of manufacture of a complete line of standard straight shank chucking reamers, straight and spiral flue from ½ to ½ diameter inclusive. This company also manufactures special reamers, end mills, milling cutters and counterbores of ½ diameter or less. The Arseneau-Price

Company has engineered and built a new type of machinery for the processing of tools of this type which enables them to produce these standard and special tools at a distinct price advantage to the trade. All such tools whether standard or special are manufactured of 18-4-1 steel, and heat treated by the electric salt bath method. The highest standard of workmanship and precision tolerance is maintained. There are certain territories available to manufacturers representatives.



Output Nearly Tripled



by Modern Drilling Method

In the operation illustrated, two Govro-Nelson Automatic Drilling Units, equipped with $7/32^{\prime\prime}$ drills, are drilling and countersinking staybolts at the rate of 100 per hour, as compared with a former maximum production rate of 35 per hour with a 4-spindle drill press.

This is but one of the many case histories in our files showing how Govro-Nelson Units are cutting production costs by the simple method of making possible a greater daily output per man in the performance of drilling operations.

Send for literature giving the output figures on a wide variety of drilling jobs. It may well be that they will help you solve your own particular drilling problems.



GOVRO-NELSON CO.

Machinists of Precision Parts for 25 Years

1933 Antoinette Detroit 8, Mich.

Automatic DRILLING UNIT

PNEUMATICS INCORPORATED

of Plymouth, Indiana, U.S.A.

These air cylinders are made to your order with any length stroke you request in any of these bore sizes: $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4, 5, 6, 8, 10

In ordering please write mounting, bore, stroke and piston rod thread you want.



Series "E" Model 1500 Foot Mount



Model 5213 Hand Lever Operated Four Way Air Valve



Plymouth Model 5422 Pilot Operated 4 Way Valve

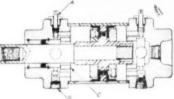


Series "E" Model 1200 Front Flange Mount

Series "E" Mo Rear Flange



Series "E" Model 1100 Trunnion Mount





These valves are made to operate double act-

ing air cylinders. They

have ½" pipe thread inlet and outlet air ports. They have full size air passages without restrictions that permit the fastest

action.

Model 5323 Foot Operated Four Way Air Valve



Metering Needle
"A" Ball Check
"B" and Bushing
"C" May be
added if cushion is
requested

Model 5522 Plymouth Single Solenoid Operated 4-Way Air Control Valves

Write for complete list and information

PNEUMATICS INCORPORATED



eral Engraving, Brass Routing, Die and **Mold Duplicating**

This new 0-16A *Gorton Super-Speed mill incorporates all of the features necessary in an "all purpose" machine. It will do a better job for you on any work within the limits of its size.

The Gorton 0-16A is rugged. It is designed for operator convenience and features extremely sensitive table and saddle controls. Spindle speeds from 300 to 10,000 R.P.M. available. 1/2 H.P. motor.

DESIGNED FOR VERSATILE DUTY-Check These Features

Heavy column, adjustable ram, super-speed spindle permanently lubricated, swivel or universal head, positive spindle brake, spindle lock, quill lock, depth stop graduated in thousandths, micrometer and lever feed on spindle.

Adaptable for . . . General engraving and brass routing by using special extension spindle and foot treadle attachments . . Die and mold duplicating by adding tracer head and dupli-

	*Trade Mark Reg. U. S. Pat. Office	and the same
	FREE all the facts FR	LEASE SEND WITHOUT OBLIGATION
	See See Seed Man M	Company
Get complete information on the new Gorton Multi-Spacer Indexing fixture with built in automatic	Seed Universal covered to the seed of the	ddress
tor Catalog 1317	d course.	State



BEDREE ENRITH MARKINE CO.

Iracer Controlled 1401 RACINE STREET . RACINE, WISCONSIN, U. S. A.

WORK CLAMPS, SUPPORTS AND FASTENINGS

for use with Drill Jigs



by C. W. Hinman Designing Engineer

In this article, which continues the series on Designing and Using Drill Jigs, which have appeared in past issues of the MACHINE and TOOL BLUE BOOK, the author discusses some of the fastening devices used with drill jigs.

BEFORE PROCEEDING with more drill jig designs, it might be appropriate to introduce some of the essential applications of work clamps, fastenings work supports, and jig accessories. The variations in these four designs are a great number and only the standard fastenings which are in common use will be discussed. Several of the designs to be presented can be used for holding work when either drilling or milling, and those for milling fixtures will be pointed out in connection with the descriptions.

The uses for drill jig fastenings fall into two classes. (1) precision fastenings for clamping work between the leaf and jig floor when the work is of precision sizes. (2) Non-precision fastenings for clamping work of variable or rough size. In the latter case an equalizer, clamp screws, tapered key, or other space members are provided in connection with the leaf, to clamp the work after the leaf fastening is tightened.

In the 1st class are cam-hooks, cam-disks, and latch-hooks. The 2nd class comprises tapered keys, draw-keys, draw-bolts, thumb screws, and nuts. However, latch-hooks and tapered keys are used in both classes. For example: In clamping rough work, a latch-hook

Subject: FILES FOR BRASS



Prenared by Nicholson Pile-Ca

THOU SO THE



FLAT BASTARD FILE



FILING BRASS

WHY BRASS REQUIRES A SPECIAL FILE

Although brass is the softer metal, it is more malleable than steel, and also very ductile and tough. Brasses differ in composition and in their characteristics; and where regular-purpose files do not meet all requirements, files having extra sharpness or special tooth construction are required for the very best results.

THE DIFFERENCE Compare a Nicholson or Black Diamond Brass File with a regular Flat Bastard File. The Brass File has a long overcut angle and a short upcut angle. The short upcut angle prevents the file from running off the work, while the long overcut, producing many tooth points on the short upcut, of the proper shape to break up the filings, allows the file to clear itself of chips.

CORRECT USE OF BRASS FILE The Brass File requires a little more pressure on the heel than on the point; and a slight motion to the right and left on alternate push strokes contributes to better filing and smooth finish. Available through your industrial distributor in Flat and Half Round shapes and in 8", 10" and 12" lengths.

 Nicholson makes special-purpose files for Brass, Lead, Aluminum, Stainless Steel, Foundry Castings, Die Castings, Die Making, Lathe Filing, Curved and Shear Tooth Filing — and Swiss Pattern Files of all shapes and sizes. FREE BOOK—"FILE FILOSOPHY."



NICHOLSON FILE COMPANY
16 Acorn St., Providence 1, R. I.
(In Canada, Port Hope, Ont.)



NICHOLSON FILES FOR EVERY PURPOSE

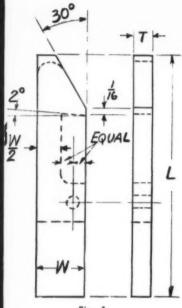


Fig. 1.

ngages instantly when closing the leaf, nd then thumb screws, a cam, or qualizer can be used in the leaf to lamp and hold the work for drilling. appreciation work.

Latch-hooks and cam-hooks are favred fastenings because of their great peed. When using them, the leaf can e opened or closed by a single motion of the operator's hand. Speed is the big factor toward increased output and owering manufacturing costs.

Fig. 1. Knurled Head Thumb Screws: These screws are used in small drill igs and milling fixtures, and for light lamping in larger tools. The head dianeter is proportional to its clamping ower. If very sensitive clamping is lesired, the thread pitch is made coarse nd the head diameter is reduced.

For light manufacturing the head may be 3_4 to $1\frac{1}{2}$ in. diameters, and the screw sizes from 5/16 to $5\frac{1}{6}$ in. diameters. The sketch shows an economical and efficient method for making these screws. It is made in two parts and riveted together. This avoids turning it from one solid piece of steel. The threaded portion can be cyanide hardened.

A good tool designer does not specify smooth-headed screws or even knurled-headed jig screws when an oil lubricant is used in drilling. The operator's fingers soon become oily and slip; he then fails to screw the work tightly against the stops and thus defeats the purpose of the screw. In such cases, flat thumb screws or wing nuts are preferable.

Fig. 2. Standard Latch Hooks: Here are the proportions for making standard latch hooks from tool steel blanks. Commercially ground tool steel stock can be used. Several hundred blanks should be stocked by manufacturers who use many drill jigs.

Fig. 2.

RIVET OVER KNURL THR'D.

RACINE

Thydraulics... FOR
SMOOTH POWER MOVEMENTS
IMPROVED MACHINE DESIGN
REDUCED OPERATING COSTS
QUIET, TROUBLE-FREE OPERATION

Spring governor provides automatic volume control, supplying only the needed flow of oil at a pre-determined pressure.

-

Tilted vanes cannot seize or gouge the pressure chamber ring. Constant efficiency is maintained.

> Meany duty pump shaft is mounted in antifriction bearings for long life and power

0

0

Pressure chamber ring of special alloy steel is automatically traversed between side plates to vary oil delivery.

COMMON APPLICATIONS FOR RACINE HYDRAULIC EQUIPMENT

saving operation.

Presses

Machine Tools

Wood Working Machines

Steering Gears

Welding Equipment

Concrete Block Machines

Plastic Presses

Aircraft Equipment

Special Machines

RACINE pumps will simplify your circuits. By-pass and relief valves with the accompanying extra piping are eliminated. Since RACINE pumps be pass no oil, heating is reduced. Horsepower is saved. Quieter operation results. These features reduce installation cost and operating expense.

Let Racine hydraulic engineers review your applications. This service is available without cost or obligation. Write today, ask for catalog P-10-C. RACIN TOOL AND MACHINE COMPANY, 1754 State Street, Racine, Wisconsin.

RACINE Hydraulic METAL CUTTING MACHINES

A complete line in capacities 6" x 6" to 20" x 20" — in all price ranges. Features are simple. One lever control — open front design — progressive feed for cutting any metal from light tubing to tough tool steels. Write for Catalog No. 12,

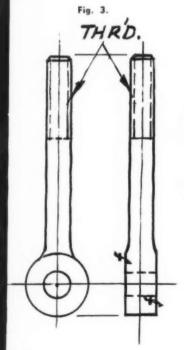




RACINE

STANDARD FOR QUALITY AND PRECISION

Blanks are usually made in four cknesses, 3/16, 5/16 7/16, and % in... d of suitable lengths, which can be termined by measuring latch hooks jigs now in use. The 2 deg. jaw ok latches over a hardened pin nich has a face of the same angle. is prevents the jaw from loosening ring heavy drilling operations. All e necessary proportions are indicated the letters. Latch hooks are usuy pinned in the leaf, and the leaf n be opened or closed by one throw the hand. The 30 deg. angle is somenes knurled as a thumb hold for resing the latch; this is a good idea prevent thumbs from slipping if an lubricant is used in connection with illing.



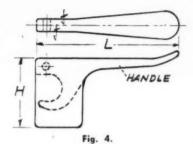
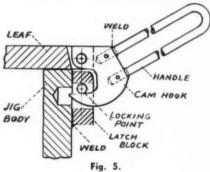
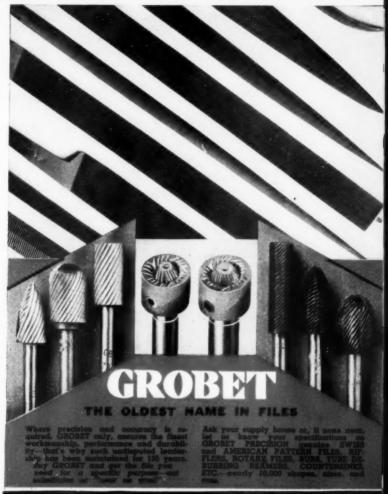


Fig. 3. Standard Draw Bolts: This jig member is sometimes called an "eyebolt." It is forged from round steel rods, and used in both drilling and milling tools. They can be purchased commercially in many diameters and of suitable lengths.

Fig. 4 Cam Hooks: These parts are machined from drop forged steel blanks, and are stocked in three or four convenient sizes. Some shops mill them



in large lots clamped side by side, and then mill finish their opposite edges. Dimension **H** should be sufficient to include long hooks. Dimension **L** should not be less than 3 in., unless the jig body used is very small. A cam hook in use was shown in the August issue of MACHINE and TOOL BLUE BOOK.



GROBET FILE CO. of AMERICA Inc.

421 Canal Street



New York, 13 N. Y

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

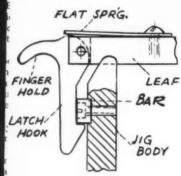
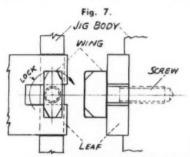


Fig. 6.

i Cam hooks are pinned in the leaf, nd like latch-hooks are speedy in opration. They can lock or unlock the saf in one throw of the handle. Cam ooks should be mounted with the pin ole at least 78 in. above the under urface of the jig feet. This provides 56 in, finger space under the handle for turning over the jig when drilling holes through bushings in either of its sides. The hook can be cyanide hardened, or the whole cam can be pack case hardened. Making them of machine steel is economical of tool steel, because most of the metal is machined off and becomes scrap.

Fig. 5. Oversize Cam Hooks: This type of cam hook is used in large drill jigs. They are built up with a round





NEW BRITAIN AUTOMATICS LOWER BREAK-EVEN POINT, ON THIS PIECE...

By

Eliminating 2nd operations
Reducing time and labor costs
Increasing production rate over 100%
Improving quality of product
Reducing material cost



A leading manufacturer formerly turned out the lock cylinder case illustrated from castings on five machines, each of which required a full time operator.

New Britain engineers were able to put the entire job on one of our new model 601 Automatics using bar stock instead of costly castings. Production is maintained at 613 pieces per hour (5.8 secs. per piece).

Eight operations plus cut-off are necessary to complete the piece. The spindle is stopped in the 4th position where the V slots are milled while the eccentric drilling attachment drills the maincylinderhole. Because specifications require the closestalianment between the



two slots and the eccentric hole, the spindle is indexed to the 5th position without changing the alignment. In the 5th position the main cylinder hole is reamed while a cutter faces the end of the piece leaving a shoulder around the hole.

For a practical solution to mounting manufacturing early in let New British engineers point the way to lowering the head-even point in your plant. Write teday for your the head-even point in your plant. Write teday for your copy of "Cast Histories" which describes many specific copy of "Cast Histories" which describes many specific agreements to more economical manufacturing an amphase.

Productivity, and price, is the measure of a modules.

NEW BRITAIN AUTOMATICS COST LESS PER FINISHED PRICE



NEW BRITAIN

Automatics

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN-GRIDLEY MACHINE DIVISION
NEW BRITAIN, CONNECTICUT

148HC2

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

steel rod U-shaped handle which is attached in the cam body either by pinning through, or by welding, as seen in the illustration.

Fig. 6. Fingerhold Latch Hooks: In this case, the leaf is opened by swinging out the latch by its fingerhold. When closing the leaf, the latch jaw snaps over the bar automatically. The bar can be turned in reverse position to take up wear. The latch can be made in various sizes to suit the jig.

Fig. 7. Thumb Bolt Lock: The leaf has a slot 1/16 in. wider than the width of the bolt head wing. The wing is turned parallel with the slot when opening or closing the leaf. A quarter turn of the wing tightens or releases the leaf. This is a popular fastening and is used in many sizes in large drill press departments.

Fig. 8. Yoke and Screw Fastening: This is an economical, simple, and quick work fastener for holding round, square, or hexagonal rod lengths. The yoke

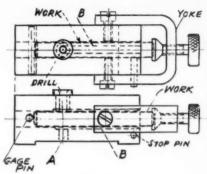


Fig. 8.

swings on two fulcrum screws and carries a thumb screw which is aligned with the work by a positive stop pin. This jig is for drilling side holes through the work.

The diameter of clearance hole A is 10 percent larger than the drill diameter. This is true of the clearance



DANLY

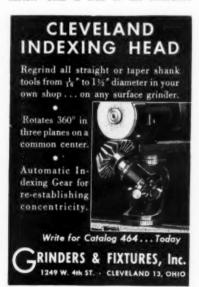
PRECISION DIE SETS

STANDARD OR SPECIAL

Their Precision Means Greater Accuracy in Your Production

DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Avenue • Chicago 50, Illinois
Milwaukee • Detroit • Cleveland • Dayton
Rochester • Philadelphia • Long Island City
Ducommun Metals & Supply Co., Los Angeles



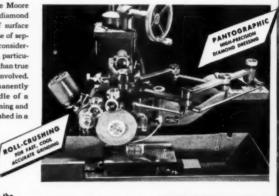
Now you can combine rollcrushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

Here's how this 2-in-1 machine does it:

- Combines Pantegraph, working directly from template, and Roll-Crushing in one device, accurately related to spindle.
- Switches from one method to the other without disturbing workpiece setting or location of either trueing device.
- 3. Ne setting up of cemplex attachments each time wheel is dressed ... no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device...crusher method saves diamond costs.
- 4. Assures highest roll-crushing accuracy and economy. Crusher roll is ground and used on same spindle, without disturbing position... no expensive machine required to grind crusher roll... no worry about hardsning distortion, because roll is ground in place from the solid directly from template.



- Takes Skill out of job, yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.
- Device need not be removed to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

MOORE SPECIAL TOOL CO., Inc. 728 UNION AVENUE, BRIDGEPORT 7, CONN.



HAVE YOU BOUGHT YOUR COPY OF 'PRECISION

Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of \$3 in U. S. A. \$3.50 outside U. S. A. 448

on toolmaking practices have been noted to date. Available at special price of \$3 in U. S. A.; \$3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tuel Co., Inc., Bridgeport 7, Cosm.

Add a MOORE to YOUR TOOLROOM

JIG BORERS - JIG GRINDERS - PANTO-CRUSH WHEEL DRESSERS
DIE FLIPPERS - COMPLETE LINE OF HOLE LOCATION ACCESSORIES

holes in all drill jigs. The object is to remove most of the burrs caused when the drill breaks through the work. Slots **B** are channel reliefs for clearing drill burrs when removing the finished work pieces.

There are no reasonable limits in the diameters or lengths of work, or the number of holes that can be drilled by using a jig design of this type.

Fig. 9. Hand Pin Screws: Here are two pin screws for clamping down a iig leaf. The screws are tapped through a swinging yoke. They are commercial standard hexagonal head steel bolts with pins driven through their heads and which project 11/2 in. on either side. The projection of the pins provide sufficiently hand hold for tightening or loosening the screws. A common error is to make the pin projections too short, the operator must then use his thumb and finger for tightening. This soon becomes an irksome job, because an uncomfortable imprint of the pin makes it too tiresome to operate the screws. The pins must be long enough to be fully grasped by the hand.

Hardened plugs, with a 5 deg. surface angle are driven in the leaf to compensate for wear of the screw points. They also hold the screws in a vertical position while clamping, and pre-

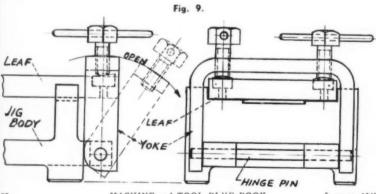
vent them from slipping off the leaf when drilling.

This equipment is designed for a large jig that has considerable width. It therefore requires two fastenings instead of the usual one at the center of the jig.

Fig. 10. Scalloped Nuts: This sketch represents a draw-bolt pinned in a jig leaf. It uses a scalloped hand nut for tightening. These nuts are drop steel forgings, but many of them are of cast iron. The scalloped indentations around the perimeter provides the operator with a good grip for tightening, either with his thumb and finger on small nuts, or by a full hand grip on the larger sizes. The nuts are commercial and are available from ½ in. diameter up to 3 in. or more. These sizes cover the entire range of small drill jigs up to the larger types.

Scalloped nuts are frequently used for tightening clamps in milling fixtures, and are also used for adjustment knobs on special machines. In the latter case they may be polished and given a desired finish.

Fig. 11. Cam Lock Finger: This illustration shows a simple method to lock a jig leaf. This is a fast, sure-shot, and convenient fastening. The cam should have a spiral rise, not the ec-



178

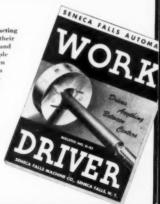


Jaws now available with angular serrations...

 These self-centering, quick-acting Drivers have long demonstrated their ability to eliminate dogging time and to enable one operator to attend multiple machines. Now their application has been

widened with development of a new jaw having serrations milled at a suitable angle. These angular serrations provide an overlapping contact for surer and quicker grip on smooth finished, as well as hot rolled stock and forgings having a relatively bard surface. This positive grip climinates slippage and resultant tool breakage... especially important when costly carbide tools are used.

Sencea Falls Work Drivers are designed for use on any engine or multiple-tool lathe and for certain work on turret tathes and grinding machines. In addition to time-saving, the Sencea Falls Judonatic Work Driver provides greater safety for the operator since there are no projecting screws or sharp corners to catch clothing or injure hands. Made in 18 standardized models for work diameters ranging from ½ to 6½ inches. Write for Bulletin D-4.3.



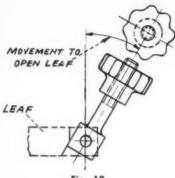
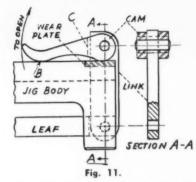


Fig. 10.

centric rise commonly used, as the latter fails to hold unless locked at or near its "dead center." A little wear on an eccentric cam will soon put it out of business. Another fault is that eccentric cams do not take care of variations in the work.

Provision for wear on the cam is



taken care of by grinding the handle at point **B**. This permits the handle to be depressed further and thus to tighten the cam.

When lifting the cam handle to unlock the leaf, point C, in the cam throat, contacts the upper square corner of the link, and continuing to lift the handle, the came and link leave their vertical positions and the leaf is released and



A powerful, fast-cutting tool, streamlined in design, easy to handle. Designed for real production work and the toughest jobs. Precision made, excellent balance. Special grease-sealed bearings . . no lubrication required. Fitted with steel housing, a special safety feature.

Representatives in Principal Cities







The knurled head of the "Unbrako" Socket Head Cap Screw makes it slip- and fumbleproof-be the fingers and heads ever so oily-therefore, it can be screwed in faster and farther before it becomes necessary to use a wrench. (B) The knurled cup point of the "Unbrako" Socket Set Screw makes it a Self-Locker-the point digs-in and stays dug-regardless of the most chattering vibration. (C) The knurling of this "Unbrako" Socket Set Screw, as shown, swages the threads so it becomes a most excellent Self-Locker-for use where the points such as: flat, dog, cone and oval do not lend themselves to knurling. Write for your copy of the "Unbrako" Catalog.

"Unbrako" and "Hallowell" Products are sold entirely through Industrial Distributors.



Kits: Pats. Pend.

You can't screw socket screws in or out without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Handle Key Kit which contains most all hex bits.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 500 - BRANCHES BOSTON - CHICAGO - DETROIT - INDIANAPOLIS - ST LOUIS - SAN FRANCISCO

swings open. This is one of the precision fastenings as discussed at the beginning of this article.

In all these drawings, double section lines are used to represent tool steel, close single lines for machinery steel, and wider spaced single lines for cast iron. This is the usual technique in most tool engineering officers.

Fig. 12. Touch Pin Supports: This sketch shows one of the many touch pin designs used for supporting a long frail work arm for either drilling or milling it. This touch pin is one of the round pin types. In operation, the work is placed in the jig and is clamped by the leaf or other means. The operator then lifts the touch with his finger. making it contact the projecting arm lightly. Next, he tightens the knurled thumb screw, an action that locks the touch pin in position for drilling. The angular position of the thumb screw presents drill thrust from altering the contact of the touch pin under

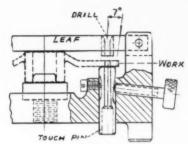


Fig. 12.

the work. Without this device, machine cuts on frail unsupported work arms are very difficult to mill or drill. Variations in the positions of the work arms are also common, but this touch pin takes good care of all such discrepancies. Using screws, tapered, keys, or other supports would obviously lift the work arm and result in doing incorrect machine work. There is also a double design for

PRODUCTS

No. 247 POWER PRESS BRAKE

STROKE-1" DIE BED-18"

47 STROKES PER MINUTE

CAPACITY-14 GA. OVER 78" 90° VEE DIE



Write for Catalog

WHITNEY METAL TOOL COMPAN) IIS PERRES ST. BOCKFORD, ILL

TOOL ROOM OPTICS

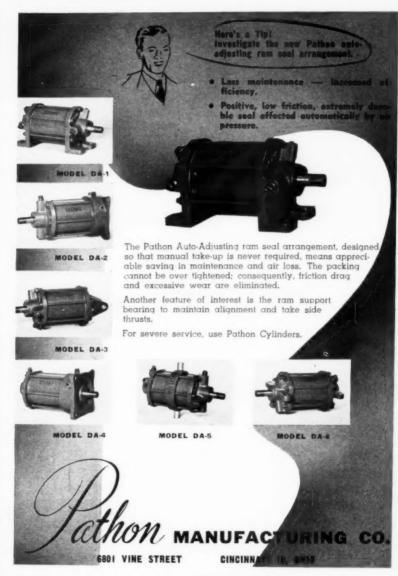
TROUBLE SEEING YOUR LAYOUTS? DIFFICULTY CENTERING THEM ACCURATELY?

Uou Need PTI-LOCATOR!

- · Functions on any machine with cross-feed. · Split - thousandth accuracy
 - in 60 seconds. · Convenient to use . . . cheap to buy.

Maita to

Dept. H 351 S. LABREA, LOS ANGELES, CALIF.

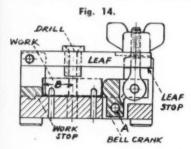


touch pins. Two pins flatted together form a split V-shaped recess which is a "nest" for the work. The pins can be elevated independently, and will take care of a two directional variation in the positions of the work arm. The reader will, no doubt, recall several other applications for this extremely versatile touch pin idea.

Fig. 13. Adjustable Pop Pins: There are many times when the pop pin principle is absolutely necessary to use in designing drilling and milling tools. An example is given in the sketch. Similar in design and purpose to the touch pin in the preceding figure, a pop pin is used for supporting a long stiff work arm, but one that is not stiff enough to resist milling or drilling thrusts. Neither are tapered keys or screws considered good supports in such cases. because they might be tightened too severely and thus lift the work arm slightly, and incorrect drilling would occur.

However, pop pin pressure would distort frail work arms and cause inaccurate work, whereas a touch pin would not. A pop pin provides a positively locked support for drilling or milling long extension parts of the work.

In operation, spring pin A, is depressed by the work when the piece is placed in the jig. But after main clamp E is tightened, spring pin A, still in contact under the work, is locked



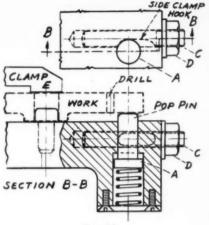


Fig. 13.

there by tightening nut **D**, on hug rod **C**. The hug has a side clamping hook around **A** that gives a positive support for the work. This is a dependable design. It it is tightened to full capacity, the spring pin will take a ton of maching thrusts without being depressed.

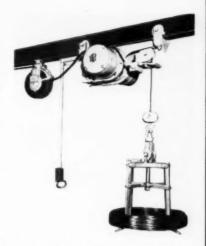
Fig. 14. Bell Crank Clamp: Here, the rounded nose on a bell crank pushes the work against a rear stop when the wing nut is tightened. The daw bolt is attached at the right of the bell crank, the latter is fulcrumed on crank pin A, and forces the work to register in its proper drilling position. Thus, dimension B, will be within the same precision limits in all the work parts drilled.

In some other cases, the nose on the bell crank is replaced by a V-block shape, and when tightening occurs, the V-block straddles the work piece and clamps and centralizes it simultaneously. (Editor's Note: A large number of work fastenings and supports are given at length in Mr. Hinman's "Practical Designs for Drilling, Milling, and Tapping Tools" published by McGraw-Hill Book Company. New York 18. N. Y.

STIFF ARM ELECTRIC HOIST PROVIDES CLOSE SPOTTING

An electric cable hoist has been developed by Yale & Towne where the use of a stiff arm for manual spotting to close tolerance is important. The stiff arm is ruggedly built so that it can be used laterally to push a bridge-beam or jib (on which the hoist may be mounted), as well as to push the hoist itself in a transverse direction.

The hoist is built in four capacities (500, 750, 1000, and 1500 lbs.) Various lifting speeds and lifting heights are available, and the equipment requires only 15¼" headroom. Hoisting and lowering is by push button control from the end of the stiff arm. Other features include: weatherproofed electrical circuits; dust-tight motor construction; one point oiling through a single reservoir; chrome nickelsteel gearing; limit switches to restrict hoisting and lowering within desired ranges; a self-actuating motor brake to control motor "drift" and permit close inching of cable and hook and a self-cooling main load brake independent of power supply.



Yale & Towne Mfg. Co., Dept. BB Stamford, Conn.



New Ideal

PNEUMATIC AIR HAMMERS and ROTARY DIE GRINDERS Far Below Factory Cost . . . Fully Guaranteed for One Year







230 IDEAL PNEUMATIC AIR ROTARY FILE & DIE GRINDERS

The IDEAL "Air-Horse" Rotary Grinder is a dual tool for tool room and machine shop work which has many advantages over more cumbersome electric grinders. It weight only 16 ounces—the lightest weight tool of its type on the market. It is only 6½" long x 1½" dia.—suiting it to all types of tool and die grinding work. A high speed, powerful tool-reaches speed of 25,000 RPM.

ACCESSORIES - 50% OFF

Many accessories available -- write for complete list. mplete list.

Star Drills — 1/4" to 3/4"
Rivet Sets—Round Heads—1/16" to 1/4"
Rivet Sets—Brazer Heads—1/16" to 1/4" Rivet Sets - Flush - 58" to 11/2" Chisels - 9" New List Price

"B" Grip Handle Type A 'A" Offset Handle Type

98 IDEAL PNEUMATIC AIR RIVETING HAMMERS

The IDEAL "Air-Horse" Riveting Hammer is especially designed and built for fast. effortless, high production riveting. Its extremely light weight, perfect balance. compact size, hand fitting grip design, ease of operation, controllable speed, all combine to make it ideal for the inexperienced beginner as well as the experienced riveter.

ACCESSORIES - 50% OFF

Many accessories available — write for complete list. Tool Post Holders

Sleeve Collets **Extension Spindles** iacobs Chucks New List Price

\$44.00

OUR SPECIAL OFFER

On lots of 1 to 5 - 40% off On lots of 6 to 10 - 45% off On lots of 11 up - 50% off

OUR SPECIAL OFFER

On lots of 1 to 5 - 45% off On lots of 6 to 10 - 50% off On lots of 11 up - 55% off

WRITE FOR COMPLETE LISTING!

\$55.00

CAMRAS EQUIPMENT COMPAN

718 W. WASHINGTON BLVD., CHICAGO 6. ILLINOIS

TELEPHONE DEARBORN 6315

WHAT HAS HAPPENED TO Women War Workers?

by C. M. Feeney Machine and Tool Blue Book

> What has happened to our ex-lady welders. riveters crane operators, milling machine operators, et al, brought into industry in tremendous numbers during the war? Are any of them still in plants, if so, what classification is marked on their clock cards? Following is a brief story of what has happened to

ROSIE THE Riveter and her sister, Winnie the Welder, are conspicuous by their absence from post-war industrial machines. During the war Rosie and Winnie riveted and welded their work in bold letters across the industrial picture. But as time fades all deeds. Rosie's and Winnie's have dimmed to dusty memories.

the erstwhile Cinderellas of the lockers.

What's happened to the thousands of women war workers, the cutting, grinding, shaping and surfacing machine operators, the welders, riveters and crane operators? According to Department of Labor statistics the woman civilian labor force increased 46.9% from 1940 to 1944. By January, 1946, this 46.9% had decreased by 20%, leaving 26.9% still in industry, but not in the same jobs they previously occupied.

Where are the 20% who left industry? Did they want to leave the factory?

What positions are now manned by the 26.9% who remained in industry?

The reasons why women left industry after the war are not hard to unearth. Returning servicemen, with their high seniority and priority on former jobs, displaced a tremendous number of women; further, with

the return of servicemen, many women returned to the stove and skillet which they had left when their husbands entered the military service. The dissatisfaction of many industrialists with women workers on many types of heavy machining operations set in motion large-scale transference from one job to another within the plant. As a result of this, women left industry of their own volition. I With the removal of war-time labor controls, many men shifted from plant to plant and replaced women. The return of service industries, curtailed during the war, absorbed many women war workers.

Are women satisfied to be out of a factory?

No, they are not. Women war workers in many areas announced their intention of returning to the machines from which they had been displaced. These are the women who developed skills during the war, and who will be most likely to want to return to their war-learned trade. About nine-tenths

of the single women (and also of the widowed and divorced) and threefifths of the married women expressed the desire to work in industry.

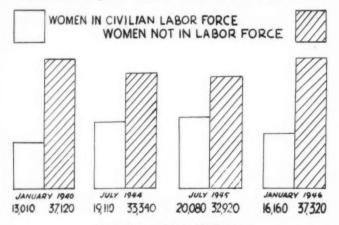
Pay checks obtainable in other types of work diminish in stature before the factory's opulent pay check; moreover, women have learned to take pride in their ability to turn a neat shaft. The fact that women in factories can band together and unionize gives a boost to their natural fraternal instincts.

Yet, women are experiencing difficulty in being re-absorbed by industry, and are not, with ease, adjusting themselves to the post-war labor market.

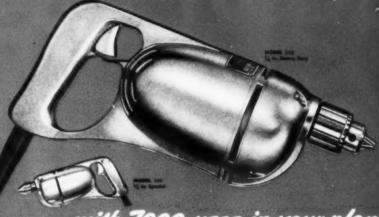
The reasons? Lack of seniority, a disinclination to return to pre-war jobs and working conditions, scarcity of high paying occupations and age handicaps. The Department of Labor points out that women have been on higher rated jobs only since the war. Scarcity of manpower during the war enabled women to develop high manufacturing

(Numbers shown in thousands)

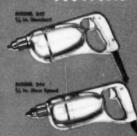
Figures were revised as of July, 1945; hence those subsequent to that date cannot be compared with those of 1940, or those of any war year. These figures are merely included to give an idea of the change that took place.



7 NEW SKIL DRILLS



.. with 7000 uses in your plant.



* These new Stat Drills are so compact, lightweight and periodity belanced... so handy on so many jobs that it's almost impossible to exaggerate their usofulness. And like all Sats Toots... the 200 Series Sats Drills represents the latest developments in Sats Tool angineering, design and craftsmanship... your assurance of too tool value per delice invested. See your Sats Teel Jobber today!

SKILSAW, ING., 5033 Eisten Ave., Chicago 30, III.
Foctory Branches in Principal Cities
In Canada: SKILTOOLS, LTD., 66 Positions St., Toronto

SKILTOOLS



SEND FOR FREE FOLDER



"MEL Drifts are mosts endoubted by SKESAW, INC.



Playing a part in maintaining the production of chemical mortar shells at Lempco Products, Inc., is the use of high frequency electrical induction for brazing the nose adapters and the base plugs to the sections of seamless tubing that make the shell.

skills; some of them had worked in factories, but the scarcity of men forced management to place women in what had been strictly men's jobs, carrying higher rates of pay. Other women had never worked in any kind of factory before the war, but once in a factory, liked it well enough to want to stay. Statistics indicate that in he period 1940 to 1944, manufacturing expanded more in the employment of women than other industries — 140% increase as against 98% for transportation, 57% for trade, 19% for agriculture, and a decrease of 10% for domestic service.

Thus, few women enjoy the necessary seniority to retain jobs and few have the job preference accorded to veterans.

Former occupations have palled beside the newly acquired skills and higher paychecks. In a sample study made in Atlanta, Georgia; Columbus, Ohio; and Trenton, New Jersey by the United States Employment Service, 40 to 61% of available postwar openings occurred in clerical, sales, or service jobs, but only 15 to 18% of the women claimed



Women have been replaced on heavier machine shop operations, like this heavy grinding job on a Brown & Sharpe machine. Brawn is required to transport heavy pieces of work; and even during the war, companies found that men had to help the women move the work.

these as their last former occupations. Reports indicate that women do not wish to resume, not only service occupations, but also some manufacturing cccupations in which they were formerly engaged. Garment and hosiery factories are reporting shortages of women workers in various localities.

Present base rates for available jobs tend to be lower than rates for wartime jobs. In addition, the elimination of overtime has reduced the take-home pay. Women hesitate to accept lower paying jobs, and many fall back on unemployment compensation for the necessities of life.

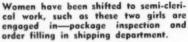
There are more older women in the postwar labor group than there were before the war. The population has aged, and by 1944 the war had increased by 10% the number of women between 35 and 45 employed in labor groups. Many older women plan to keep on working. One factor here might be that unmarried women who, previous to the war stayed home, have acquired the taste for independence. In Women's



ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETI BUILDERS OF PRECISION SPINDLE





Bureau studies in war congested areas, 81% of women workers, 45 and over, indicated their intention to continue in the labor force as compared to only 70-75% of those groups 20 to 44 years.

Women especially excel in working with small parts where exacting precision is required. Here a woman operator is assembling 3rd, 4th and escape wheels and mainspring barrel of 8/0 watch at Elgin National Watch Company.





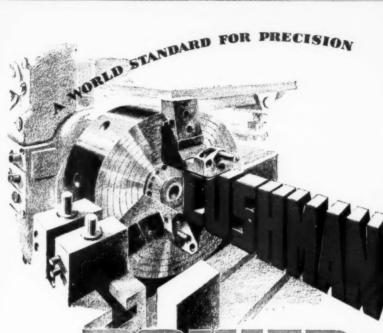
Women are still on light riveting jobs as testified by this Westinghouse riveter of radio parts before the radio is started down the assembly line.

As always, women over 35 or 45 probably will experience difficulty in finding jobs. If there is a choice, employers tend to hire younger help. Of 1000 job openings in Connecticut early in 1946, the maximum hiring age for nearly 60% of the clerical jobs was found to be 35 years or less, for approximately 55% of the factory jobs 40 years or under.

The machine tool industry typifies the pattern followed by employment of women in industry before, during and after the war.

Prior to 1940, leading machine tool companies were apathetic to the presence of women on shop jobs. For one thing, the mere presence of women in the shop had a distracting effect. Even the clerical jobs in some shops were handled by male employes; and women, who were given non-productive jobs in the shop division, usually worked in office areas and seldom went into manufacturing areas.

But everyone during the war was forced to hire them in some capacity or other, due to shortage of manpower and increased war orders. Many shops, for the first time, hired women for assembly and erection, inspection and



WRITE FOR CATALOG PO-62

THE CUSHMAN CHUCK COMPANY HARTFORD, CONNECTICUT



lashing new addition to a famous line
:HICAGO WHEEL & MFG. CO.

Headquarters for
NOUNTED WHEELS and SMALL GRINDING WHEELS

Here's a sentational grinding wheel. It's the startling, shining SILVE.

REAR, envineered for super-swift performance, unprecedented efficiency is

aring and finishing, kept constantly FRESH by a protective metallic film.

The it yourself. Stronger than words is the proof you will see for yourself, in

you own plant, that the new SILVER STREAK is the wheel you can't afford to

acts by, the wheel that solves your grinding problems. Tell us the kind of jok

you have. We'll send you a test SILVER STREAK promptly.

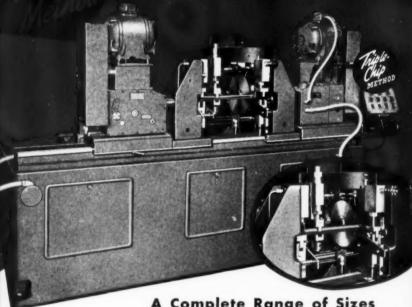
Write for catalog of Chicago Grinding Wheels, Mounted Wheels and Tools

GO WHEEL &



10T JUST A EW MACHINE

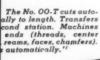
No.00-T



A Complete Range of Sizes is Now Available

A new method, definitely. There are no other machines like the No. 00-T M. & M. Transfer Circular Sawing Machine. It "operates on" both ends of solid bars or tubing simultaneously. It cuts stock to square, accurate milled lengths by the Triple-Chip Method and transfers it to a second station to be machined on both ends while the next piece is being sawed. Both inside and outside diameters, for example, can be chamfered. Operation is automatic from start to finish. Eliminate costly second operations! Get the details now.

Ask for our well illustrated Bulletin "B-1".





THE MOTCH & MERRYWEATHER MACHINERY CO



Internal grinding head with work head swiveled.

ARTER

ANNOUNCES

Combination External and Internal Grinder-In-One

(Grenby Series 103)



External head swiveled with quick collet closing attachment and radius dresser.

Now manufactured by ARTER, this hydraulic grinder can be obtained as an external grinder or with both grinding heads. External capacity — 3" diameter by 10" long; internal capacity — 1/8" to 3" dia. by 4" long. Swing-over table is 9".



ARTER GRINDING MACHINE COMPANY

WORCESTER, MASSACHUSETTS . U. S. A.



HC-S

These days, the lasting quality of Haskins Flexible Shaft machines is minimizing production difficulties and delays wherever they're at work. Many 20-

year-old Haskins portable tools are still on the job; and their usefulness covers everything from die polishing and buffing to heavy duty sanding and rotary filing!

tools that LAST!

It's an asset, this Haskins quality—an asset that stands ready to help you.

Send for full information.
R. G. HASKINS COMPANY,
2645 W. Harrison St.,
Chicago 12, Illinois.

kaskins.

burring, for operation of engine lathes, gear cutting machines, drill press and crane operation, and as scraper hands and tool crib attendants.

During normal times, one organization carried approximately 60 women on productive work. In 1943, that figure jumped to nearly 900. On non-productive work, the figure bounded from 120 to over 600. The total employment of women increased from a normal force of around 400 to a peak force of over 2,200 and the percentage of women employes went from 7.5% to 26%. On production work the percentage of women increased from slightly over 1% to more than 12% and on non-productive shop work from 15% to over 40%.

Although their record was excellent, after the war was over, the number of women decreased, some leaving of their own volition, others being laid off for

An operation of which women might be found useful is this example of a girl operator handling 3200 pound load with fork-lift truck at American Welding & Mfg. Co. The truck is simple to operate and men can be released for heavier jobs.





A Simple, Rigid, Reliable Instrument With Many Uses

Any #2 or #3 Size AGD Indicator With Standard Type Back May Be Used - Also the



115" DIAM

(Model 108)

Contact Pressure Can Be Regulated

Entirely Self-Contained

Anvils Rigidly Mounted On Heavy Base

Fine Adjustment Easily Made With Wing Handle



STANDARD Micronar INDICATOR

SERRATED

A high amplification, high accuracy instrument, ideal for use on this Comparator.

METRIC MODEL

(CENTER SECTION)

RANGE .0018"

GRADUATED .001 mm. RANGE .04 mm.



STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.

Operator at Brown & Sharpe Milling Machine. On lighter operations like this, women employes proved satisfactory enough during the war to be retained in similar occupations after the war.

excellent reasons. The primary reason given by most companies for separating women on V-J Day was to make room for returned service men.

Other reasons were equally valid. The nature of shop operations in some companies is mainly short cycle, for the most part one-piece operations, and require skill in setting up machines. The women lacked this experience, and did not produce nearly so much as men. On jobs like crane operators and inspectors in small work, women's efficiency compared favorably with that of men.

Other companies manufacture heavy machine tools which require fine mechanical skill, observance to close tolerances, working with oil and coolants,



and sometimes sustained physical effort, which would generally be considered beyond female endurance and aptitude. Heavy drilling, planing, grinding and

BUILT FOR YEARS OF DEPENDABLE SERVICE

The Marschke Heavy Duty Wide Type Grinder supports the carefully machined and ground spindle in four accurately aligned ball bearings. The spindle and motor housing are cradled in a massive. Jine-bored U-type base which extends up and around the motor ends thereby providing an exceptionally rigid construction.

Equipped with Marschke Universally Adjustable Guards for all around safety and convenience, this wider type grinder provides good clearance between wheel and base for bulky, irregularly shaped work pieces—also ample elbow room between operators.

The motor is totally enclosed, and the boarings are fully protected against entrance of grit. Quality materials and high standards of workmanship assure years of dependable service under the most severe duty. The Marschke Heavy Duty Wide Type Grinder is available with 5, 7½ or 10 HP motors for 18 or 20 by 3 inch wheels. Write today for further details.





VONNEGUT BRUSH BACKED SANDER HEADS



VONNEGUT ELECTRIC MOULDERS



MARSCHRE GRINDERS

ONNEGUT MOULDER CORPORAT

DISSTON METAL CUTTING BAND SAWS

In Types, Patterns, Tempers for All Metals, All Speeds

HARDENED THROUGHOUT



Regular type for normal high speed cutting. RABARAR

Reinforced type for heavy-duty, speed cutting.

'For high speed cutting of non-ferrous metals, plastics and many other materials. Made with Regular and Reinforced teeth in all standard dimensions. Also recommended for friction cutting of ferrous metals at speeds of not less than 12,000 f.p.m.

HARD EDGE, FLEXIBLE BACK

DISSTON USA

Buttress tooth pattern for speeds of 3,000 f.p.m. and over.



Regular type for nor-mal low speed cutting.

Hardened on tooth edge only. Teeth are milled (not punched) and accurately set by machine. Made with Regular type teeth for general metal cutting at low speeds; and with Buttress type teeth for machines operating at speeds of 3,000 or more f.p.m. ... specially recommended for magnesium and aluminum alloys.

For Better Metal-Cutting Tools

Ask for Disston Files . . . Hack Saw Blades . . . Circular Saws . . Carboloy Fitted Circular Saws . . . Tool Bits.

Order from your DISSTON Distributor or write direct for further particulars.



DISSTON Safety Reel



An improved design with added features. Supplied with all sizes of Hard Edge added Flexible Back blades from 1/4" to 1/2 in coils of %" to ½ 100 feet.

HENRY DISSTON & SONS, INC., 149 Tacony, Philadelphia 35, Pa., U. S. A. In Canada, write: 2-20 Fraser Ave., Toronto 1, Ont.



IDEAL "Select-O-Speed" Variable Transmissions Lovejoy

has acquired the famous IDEAL line. Deliveries from stock. Easily installed in line of drive of old or new machines. Touch of finger increases or slows speed exactly as desired.

Sizes up to 7½ h.p. Ratios up to 18:1. Changes speed while running.



AT LOW COST!

Fewest wearing parts. Alemite fittings.

Send for IDEAL Catalog

Also shows IDEAL Variable Speed Pulleys, Drive Sheaves, Adjustable Motor Bases, V-Belts, standard and wide, etc. Wire or write

Mfd. by

LOVEJOY FLEXIBLE COUPLING CO.

Mfrs. of Lovejey L-R Flexible Shaft Couplings 5026 W. Lake St. Chicago 44, III.

assembly jobs tax a woman's strength, and they need assistance in getting heavy parts in the machines and on the work benches.

Still other women were terminated because, with the availability of male help, the company insisted that all employes fulfill the requirements of the various classifications. During the war years, women were not obliged to fulfill these requirements, particularly the setting-up of the machines. As a result, they left the company rather than do the more arduous work.

What about the 20% who remained in factories? Have their duties changed in the post-war production picture?

Spot checks made by the MACHINE and TOOL BLUE BOOK indicate that women who manned machines during the war have been transferred to light assembly operations, production control, inspection, and light machining work.

Before the war, one organization employed no women at all; now the employment in unskilled jobs is 85% women. The business is unusual, however, because they do not have the usual distribution of unskilled, semi-

Industrial photography received an impetus during the war—metal is photographed for flaws, photostatic copies are made of documents, etc.. Women can handle this type of work easily.



Special CARBIDE TOOL GRINDER



FOR QUICKLY AND ACCURATELY SHARPENING CARBIDE TOOLS

BALDOR GRINDER, series 500, (shown above) is the newest development in grinders designed and fully equipped for sharpening Carbide Tools quickly and accurately; has sturdy ½ H.P., reversible, ball-bearing motor. 6" Silicon Carbide wheels; adjustable tool-rest tables, water pot. Complete as illustrated and GAURANTEED 2 YEARS against burn-out.

Reasonably Prompt Shipment

ASK FOR BALDOR BULLETIN 321C ON COMPLETE LINE



BALDOR Bench Grinder 8100 Series AT LEFT: BALDOR Grinder, 8100 series. 8" Aloxite wheels; bull-bearing motor; ½ h.p., (1700 rpm.) and ¾ h.p., (3400 rpm.); 1-phose, 3-phose or D. C.

BALDOR ELECTRIC COMPANY 4368 Duncan Ave., ST. LOUIS 10, MO.

District Offices in Principal Cities

BALDOR
BALL
BEARING GRINDERS



The postwar woman may be found in light jobs such as this operator of a Westinghouse machine which winds at one time 28 transformer coils used in fluorescent lighting. The machine does the work, the operator watches the controls.

skilled and skilled workers. There are very few semi-skilled workers and many skilled workers. Therefore, the company cannot promise their many unskilled employes advancement into the relatively few semi-skilled jobs. The consequences of this are minimized by their above average unskilled labor rates. This situation also favors the hiring of women who are usually less dissatisfied than men if they are unable to work into a semi-skilled job. Most of the skilled employes are journeyman toolmakers, which explains the absence of women from the skilled occupations of this company.

Another organization now employs two gear cutting machine operators, two burrers, two inspectors and one tool crib attendant, all females.

Most companies report that women work well in timekeeping, shipping and stock, factory clerical and cleaning work.



Using delicate testing equipment, this meter reader runs through a check on transformers in the Incoming Inspection Department of the Home Radio Division, Westinghouse Electric Corporation.

At another company, women hold approximately 5% of the productive jobs and 25% of the shop non-productive jobs. In the non-productive group comprised of the Engineering, Drafting, Estimating and Personnel Departments, they still have 39% female help. Their total employment still includes about 18% women. As a rule, jobs requiring a high degree of manipulative dexterity are done better by women and they have many of these jobs. Shop clerical jobs and cleaning jobs are handled more efficiently by women, according to another company.

So, Rosie and Winnie may be gone, but they're not forgotten. They've opened the door for a good many of their sisters, lifted the taboo against women in industry a little, and introduced many women, hitherto ignorant of opportunities along these lines, to industry. THE END.





Staples Offers

A COMPLETE LINE OF CARBOLOY-TIPPED TOOLS



The name STAPLES has for many years been symbolic of undeviating high quality in the manufacture of Carboloy Cemented Carbide circular cutting tools. Now, to meet the increased demand for Staples quality, our facilities have been expanded to include Carboloy Cemented Carbide turning, boring, facing, roller turner tools—milling cutters—form tools—centers—masonry drills.

This new, complete line of standard Staples Tools is now available for immediate delivery. For all special tools, submit your requirements to Staples Design and Engineering Service. Write today for new catalog and complete information.

THE STAPLES TOOL COMPANY

CINCINNATI 25, OHIO

write for your complete complete Staples Tool

Staples CARBOLOY CEMENTED CARBIDE TOOLS

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS EXPANSION REAMERS · FORM TOOLS · CENTERS · MASONRY DRILLS · SPECIAL TOOLS

Letter from England



Written for the MACHINE and TOOL BLUE BOOK by Robert Hutcheson, Editor of MACHINE SHOP MAGAZINE, London, England.



D URING THE past several weeks reports have been coming to hand on your Chicago Machine Tool Exhibition, made by British engineers who visited U.S.A. Many of the reports naturally contrast your conditions with our own. For example Mr. T.P.N. Burness, managing director of William Asquith Ltd., one of our largest machine tool building firms, says:

"The passenger list (of the "Queen Elizabeth") had a distinctly international machine tool flavour which was ample evidence that the American Machine Tool Show had excited intense interest in the minds of the European machine tool mak-

ATE

"During the Show, the weather was extremely hot, and the atmospheric conditions inside the Show made it a very try-

ing ordeal for British visitors.
"As for the Show itself, it

"As for the Show itself, there is no doubt that the American machine tool industry has every reason to be proud of this Exhibition of American machine tools. . . .

"Generally speaking, the exhibits were extremely well finished, not only in the question of paint-work, but in general finish and detail the work was of a very

high standard. . . .

"Visits by the writer were paid to the works of The Cincinnati Milling Machine Company, The Cincinnati-Bickford Company of Cincinnati, The Ingersoll Milling Machine Company of Rockford, Illinots, and the

Giddings and Lewis plant at Fond du Lac. Wisconsin.

"These machine tool plants are typical of all that is best in American machine tool factories, and one was struck by the extreme cleanliness exercised in every department. It is true the atmospheric conditions there do not have the same amount of suspended grit and grime, but there is little doubt we could all emulate their standard of cleanliness with advantage.

"The men engaged in the industry are, generally speaking, high-class craftsmen, and very jealous of the reputation of the

firm for whom they work.

"The working conditions were very good, and the output per man I considered was something similar to that which we have experienced during the last year in our own factory.

"The disciplinary control within the works was much tighter than is the case in this country, and in many shops no smoking

at all is allowed.

"The works in general are more commodious for the number of people employed, and, of course, in nearly all cases the buildings and plant are of comparatively

recent construction.

"Living conditions in America are not by any means ideal. There is an acute housing shortage, due to the fact that no body can afford to build, solely because of the high wages demanded by the building industries, and not to any shortage of

Busy days ahead!

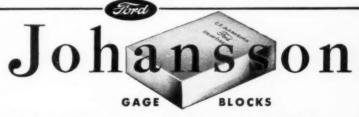
IT MAY be that long service IT may be that long service

It may be that long service or careless handling has worn many of your most-used gage blocks until they're 'way out of tolerance. It pays to know which blocks need recondition-

ing or replacement. Send your whole set of blocks in to Ford for inspection. Cost is only 25 cents a block for "A" and "B" blocks up to one inch, or for each inch of length of longer blocks. (Minimum charge \$1.) Details, methods, costs, of reconditioning your gage blocks, including the Ford chrome-plating method, sent on request. Write—

with each inspection.

FORD MOTOR COMPANY • JOHANSSON DIVISION 3606 Schaefer Road, Dearborn, Mich.



materials. Food is plentiful, but dear.

The subject of the Presidential Address by Mr. F.P. Laurens, of the London Section of the Institution of Production Engineers, was his impressions of the Exhibition and of his visits to various engineering works. He emphasised the high degree of automatic control of machines and the extent to which man-handling of components is reduced. He had with him one of the metal walking canes that came off the big press-brake at the show, and everyone who inspected it was impressed by the neatness of the job. One point he made surprised his listeners; his enquiries indicated that only about 20% of the machining done in the United States is performed with cemented carbide tools in view of the prominence given to carbide tools in American technical journals the general assumption here has been that the figure would have been substantially higher.

A will that caused some astonishment was that of Mr. Robert A. Hopkinson who died recently. Mr. Hopkinson was formerly chairman and managing director of Hopkinson Ltd., Huddersfield the world-famous firm of valve makers. Under his will £250,000 or more has been bequeathed to the Labour Party.

October exports were up by over nine million pounds giving a total for the month of £108,200,000. The motor industry contributed towards this by exporting 14,186 new cars and 1,030 chasses. Although imports were high there was a narrowing of the adverse trade gap by £9,100,000.

About seventy-five of our makers of gauges, measuring instruments, jigs, fixtures, press tools, moulds, and other items of precision tooling equipment are getting ready for the Gauge and Tool Exhibition to be held here in London from 26th January to 6th February 1948. Among the tools to be shown it is hoped that there will be: a vernier depth gauge of 3 ft. capacity; a series of all-steel presses designed by a firm of trade press-tool makers. of 6, 10 and 20 tons capacities: a new machine for checking the pressure angle of gear hobbing cutters and worms; several new types of diamond truing tools that are especially suitable for truing formed

grinding wheels; and various developments in optical measuring equipment.

British engineers are maring setious efforts to obtain oilfields' business, and one step in this direction is the marketing of the Botec-Fielding duplex power-driven slush pump. It has a power input of 165 b.h.p. at 346.5 rpm which, through 5.33 to 1 gearing, gives 260 twelve-inch working strokes per minute; the pump has calculated capacities of from 150 imp. gals, per min. with 5 in. liner to 400 per min. with 7½ in. per liner. Working pressures at the fluid and suction manifold are 2,000 lb. sq. in. while the test pressures are 3,500 lb. sq. in.

The fluid end, cast in steel by the David Brown Foundries, is a new English adaptation for this purpose and is the result of close collaboration between the designers and founders, their final agreement on technique being supported by X-ray examination of the prototypes. The pump has several interesting features and is built largely from steel castings and forgings, particular care being taken in their quality and design, and in the accuracy of quality of the machined surfaces.

1st. January 1948 is the day on which British railways are to be nationalised and the whole system will be called "British Railways" instead of bearing the names of the several companies that operate our railways today. The country will be divided into six regions, although more may be created later; five of these will be in England and Wales while the sixth will cover Scotland. No prospects are given of immediately better services under nationalisation in view of today's economic situation, and one factor that is said to prevent early improvement is the age of existing rolling stock - a guarter of our railway vehicles are 35 years old.

AXIAL AIR GAP MOTOR

Versatility in application shown by possibility of horizontal, vertical and pivot base mounting. Features of construction describe rotor, stator, ball bearings, inside frame. Dimensions, pictures and line drawings complete description. 15 pages. Fairbanks-Morse & Co., Dept. BB, Fairbanks-Morse Bidg., Chicago 5, Ill.

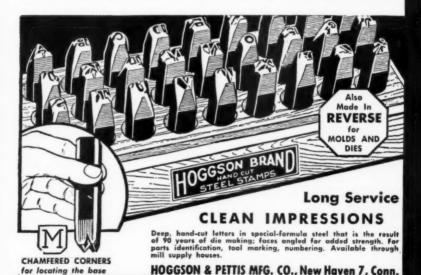
SAVES TIME -- MAKES MONEY MARSHALLTOWN THROATLESS SHEARS

CUTS ANY SHAPE CUTS ANY SIZE CAPACITY UP TO 1/4" STOCK

Here's the shear that offers best performance features. Cutting speed 6' per minute. High grade tool steel cutters. Write today for details. Prompt shipment.

MARSHALLTOWN MFG. COMPANY 900 Nevada Street Marshalltown, Iowa





for locating the base

Hand operation—job held in spinner.



As easy to use as a backstand polisher or grinding jack.

Contact wheel can protrude just the right amount for properly presenting the work. Full latitude for manipulating a piece to grind long flats, catch corners, do the ends, etc.

Write Today



for the new manual en grinding and polishing. It's free. Ask for the film: Machine of the Age. Loaned FREE for staff meetings.

Make MORE PROFITS

on contour grinding flat-face grinding, polishing

One machine does them all Easier! Better! FASTER!

PORTER-CABLE C-6 Belt Grinder-Polisher

The NEW C-6 eliminates costly set-up time and wheel dressing . . . reduces fatigue . . . cuts polishing time by 30% to 50% . . . improves finish and quality . . . grinds a larger variety of shapes in less time.

For flat-face grinding or polishing you merely use the unshaped contact roll.

For contour grinding the shape you want is easily turned into the sisal-latex material of the contact roll. The belt drapes itself into the contour.

The Contact Roll holds its shape indefinitely. Runs true, since it is not on the drive pulley. Not shaken by motor vibration. Is adjustable to travel the belt at any angle up to 15° off tangent. This makes possible a large variety of shapes and contours.

Abrasive Belt is evenly loaded . . . does not overheat . . . actually does all the cutting work. Does not require dressing . . . easily replaced in a few minutes.

Every shop needs this new money-maker! The New C-6!

PORTER-CABLE

MACHINE CO.

300-1 Exchange St.

Syracuse 8, N.Y.

News of the industry.

N.M.T.B.A. ADVOCATES REVISED TAX PROGRAM AND INCREASED SALES PROMOTION FOR 1948

Production requirements on behalf of both world reconstruction and our domestic economy, plus considerations of our own national defense, make it imperative that the machine tool industry of our country turn out large quantities of the finest and most modern machine tools that American ingenuity can produce, Herbert H. Pease, President of the National Machine Tool Builders' Association, and President of the New Britain Machine Company, told members of the National Machine Tool Builders' Association at the opening session of its Fall Meeting held at the Homestead Hotel, Hot Springs, Va. on November 17.

Other business taken up at the meeting included the election of officers for the year 1948 and the proposal of an eightpoint program of federal tax revision.

Mr. Pease made the following threepoint recommendation:

1. A change in the depreciation policy

of the Treasury Department with respect

 A change in our basic tax laws, that will permit companies to plow back more earnings into re-equipment, without being penalized for doing so:

3. An aggressive sales policy on the part of the machine tool industry to prove to customers that new machine tools today must be considered not in the light of their cost, but in the light of their performance in reducing operating costs.

New officers for the current year are: president: Alexander G. Bryant, vice president of the Cleereman Machine Tool Co., Chicago; first vice president: Lloyd D. McDonald, vice president of Warner & Swasey Co., Cleveland, Ohio; second vice president: David Ayr, president of the Hendy Machine Co., Torrington, Conn. Re-elected officers were: treasurer Louis Polk, president of Sheffield Corp.,

Alexander G. Bryant

Lloyd D. McDonald

David Avr

Louis Polk









When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Dayton, Ohio; secretary: Frida F. Selbert; and general manager: Tell Berna..

New directors elected were: David Ayr; Harold B. Smith, president Illinois Tool Works, Chicago, Illinois; and M. A. Hollengreen, executive vice president and general manager, Landis Tool Company, Waynesboro, Pa.

Stressing that the only hope for more goods in the United States is in obtaining greater production, Bryant told Association members that 1948 model machine tools are on the average at least onethird more productive than their corresponding types built prior to, or during the war.

"A survey indicates," he said, "that increases in efficiency range from as little as 10 per cent on a few types to as much as 500 per cent on some remarkable developments.

There are probably in existence in the United States today about one and three-quarter million power-driven metal cutting machine tools. At least one-third of these are over 20 years old. All of the

balance, including the machines installed during the war and until recent months, are either more than 10 years of actual age, or they are of designs that are at least 10 years old.

"Designs were practically frozen during the war and it was not until the present models were introduced this Fall at the Machine Tool Show in Chicago that most of the really modern machines became available. Even the wonderful machine tools used to accomplish our war production are now outmoded."

The federal tax revision was proposed by F. S. Blackall, Jr., president of The Taft-Peirce Mfg. Co., Woonsocket, R. I., and chairman of the Association's committee on fiscal problems, and includes:

- (1) Liberalization of depreciation al-lowances to permit the taxpayer to establish his own rates, provided he follows them consistently.
- (2) Either the outright repeal of section 102, which provides for a penalty tax on "unreasonable accumulation of tax on "unreasonable accumulation of surplus"; or else its modification to apply only to cases of deliberate tax evasion.
- (3) A three- year carry-back and a six-year carry-forward.
- (4) Modification of existing surtax rates to provide for an immediate ceiling of 60% and an ultimate ceiling of 50%.
- (5) Reduction in the capital gains tax and full recognition of capital losses for tax purposes.
- (6) Elimination of the double taxation of corporate dividends.
- (7) Extension of the community property principle of federal income taxation to the people of all of the states.
- (8) Elimination from the gross valuation of a decedent's estate of insurance carried by the decedent, at least to the extent of the amount of tax payable.

Costs Reduction is Major Theme at Materials Handling Conference

Materials handling may well be the key to greater profits for many a factory. In the face of rising costs, industry cannot afford to overlook any possible means of saving resources on hand. handling can decrease costs, simply by eliminating or cutting down unnecessary movement of materials and by diverting the resulting savings in manhours to some other important task.

In this direction, the National Materials Handling Exposition will benefit management with its show at the Public Auditorium in Cleveland on January 12-16. inclusive

More than a dozen topics of vital interest to top management executives will be discussed at the Conference on Materials Handling which will be a feature of the Exposition.

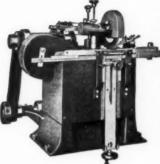
The major theme of the discussion is cost reduction through improved handling and discussion subjects have been selected

for their widest appeal from the practical. operating standpoint. With material and labor costs at all-time highs, reductions in the expenses of handling-a completely non-productive operation-represent one of the few fields for savings still open. Discussions will include all phases of the handling operations, from the viewpoint of manufacturer, distributor, jobber and retailer, and will include problems of warehousing and shipping.

Concurrently with the exposition and conference, the management division and materials handling division of the American Society of Mechanical Engineers will meet in Cleveland Jan. 13 and 14 for a series of technical and professional presentations on materials handling subjects.

Keenest interest among top management executives is expected to center on these discussions: "Handling factors in plant layout"; "Vertical, horizontal and inter-floor handling"; "Reckoning with

More Metal cut per dollar ...when blade is sharpened with E.C.



Properly sharpened metal cutting saws last longer. In fact E.C. Combination Metal Cutting Circular, Hack and Band Saw Grinder has demonstrated it can pay for itself within a year by the savings on blades alone.

Blades not only last longer, but cut cleaner and faster with minimum destructive effect on teeth. Write for Bulletin E.C.

THE WARDWELL MANUFACTURING CO. 3165 Fulton Road, Cleveland 9, Ohio



floor loads and elevator capacities";
"When manual operations pay"; "Standardization in materials nandling equipment"; "Integrating different types of equipment"; "Personal relations factors in handling," and "Time and motion techniques in handling."

Other important topics include: "Preventive maintenance of equipment"; "What service ought the customer expect from the manufacturer?"; "Arranging stock for effective handling"; "Planned packing for efficient handling"; "Handling unusual shapes"; "Handling bulk products; "Safety principles in handling"; and "Handling small parts."

The Materials Handling Exposition has grown to rank among the top fifteen industrial shows within the space of one year. Although almost three times as much exhibit space was provided for the second show than was available for the first, it proved insufficient and new exhibit areas were added last week.

Appproximately 180 exhibitors will show hand trucks, lift trucks, conveyors, hoists, monorails, portable elevators, stacking units, tractors, trailers, fork trucks, skids, pallets and their respective accessories. A Materials Handling Theatre will exhibit films on handling subjects.

2nd NATIONAL MATERIALS HANDLING

EXPUSITION	
Exhibitor	Booth No.
Acme Pallet Co	
Acme Steel Co	
Addison-Semmes Corp	528
Aeroquip Corp	435 433
The American Pulley Co	437
Anthony Co	
Arkansas Pallet Corp	530
Assoc. of Lift Trucks &	1
Portable Elevators	1
Caster & Floor Truck Manufacturers Association	101,102
The Electric Industrial Truck	108,109
Assoc.	1
Material Handling Inst	,
Atlantic Distributors, Inc	514
Automatic Transportation Co	404, 405,
406, and 416, 417, 418	P4.4
Automotive Rubber Co The Baker-Raulang Co	
William Ral Corn	535
William Bal Corp Barber-Greene Co	.520, 521, 522
Barrett-Cravens Co	.322, 334, 335
The Bassick Co	118, 119



Bearing & Transmission Co	16
Brummeler Steel Prod. Corp. 4 The Buda Co. 20 The E. W. Buschman Co., Inc. 40 C & C Battery Co. Chisholm-Moore Hoist Corp. 55 Clark Trustractor 407, 408, 409, an	36 09 03 7 26
419, 420, 42	21
The Cleveland Wire Spring Co50	15
The Colson Corp41	13
Concret Most Corp.	in
Conveyor Repair Service Inc 51	11
The Colson Corp	1
Distribution Age51	16
Distribution Age	1
Drake, Startzman, Sheahan, Barclay,	_
Inc51	2
The Floatric Prod Co	11
Thos. Edison, Inc. 43 The Electric Prod. Co. 50 The Electric Storage Battery Co. 11	5
Elizabeth Iron Wks	3
Elwell Parker Electric Co426, 43	0
Equipment Mfg., Inc 1	3
Fab-Weld Corp32	9
The Fairbanks Co. 20	1
Faultless Caster Corp20	8
Harry J. Ferguson Co., Inc	6
Flow - (Magazine)	5
General Flortric Co	7
The Geneva Metal Wheel Co20	5
A. J. Gerrard & Co11	4
Gerrard Steel Strapping Co10	4
Globe Hoist Co	4
J W Greer Co	3
Harnischfeger Corp	3
W. F. Hebard & Co610	6
The Hertner Electric Co	6
The Frank G. Hough Co	4
Hyster Co	ī
Industrial Pallet Co., Inc540	0
Industrial Washing Machine Corp53	8
Incley Manufacturing Corp. 314	4
Island Equipment Corp618, 619, 620	Ô
The Electric Prod. Co	4
Keen Manufacturing Corp532	2
The Lapham Co	2
Lawrence Pallet Exchange	9
G. B. Lewis Co545	5
The Lanham Co. 12 Lawrence Pallet Exchange 52 G. B. Lewis Co. 54 Lewis Shepard Prod., Inc. 612	2
Lyon-Raymond Corp328	5
When Writing Advertisers Please Mention M	M

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vice No.	Width of	Opens	Weight	
	Jaw, Inches	Inches	Pounds	
1D 2D	31/2	31/4 51/2	121/2	

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
1335 SO. MAIN ST.
MEADVILLE, PENNSYLVANIA

SAVES TOOL MAKERS' TIME T R O Y K E ROTARY TABLES



TROYKE MFG. CO.

Magnesium Company of America410
Mansaver Industries, Inc513
Marsh Stencil Machine Co103
Marsh Stencil Machine Co
mission313
Material Movement Industries116, 117
May Fran Engineering Inc423
Meese, Inc
The Mercury Mig. Co609
Merrill Bros438
Mobilift336
Modern Materials Handling425
Monroe Auto Equip. Co312
Morrison Co
Motor Generator Corp536
The Moto-Truc Co
National Metal Edge Box
National Pallet Corp523
National Wooden Box Assoc 10
Nook and O'Neill, Inc
Nutting Truck and Caster Co402
Ohio Equipment Co., Inc
Orangeville Mfg. Co320
Otis Elevator Co
Ozark Pallet Co
Pallets Inc
Pallet Sales Corp428
Pallet Systems Inc
Patron Transmission Co., Inc533
Penton Publishing Co
Pittsburgh Steel Prod. Co
The state of the s

The Powell Pressed Steel Co431,	400
Production Aids, Inc	601
Rack Engineering Co	107
The Rapids-Standard Co., Inc	610
The Ready-Power Co	401
The Ready-Power Co	518
Pavalator Co	203
Revolator Co	419
Richards-Wilcox Mig. Co	412
Robbins & Myers, Inc.	429
Ross Carrier Co 605, 606,	608
Rotary Lift Co	14
The Sabin Machine Co	120
Saginaw Products Corp	542
Salsbury Motors, Inc.	
Schwitzer-Cummins Co	325
Schwitzer-Cummins Co	333
Sherman Paper Products Corp	541
Sherman Paper Products Corp	195
Signode Steel Strapping Co	421
Silent Hoist & Crane Co., Inc	330
The Sisalkraft Co	510
The Sisalkraft Co. Skarnes Engineering & Supply Co	504
Smith Power Transmission Co	602
Speedways Conveyors Inc	202
Speedways Conveyors, Inc Standard Conveyor Co 508 and	615
The Stanley Works	597
Charl Davis Mer Ca	217
Steel-Parts Mfg. Co	116
Sterling Bolt Co	111
Stratton Equip. Co	614
Thermoid Rubber	604
Thermoid Rubber The Thew Shovel Co	332
Thomas Truck & Caster Co.	2
Townstor Corp	611
Towmotor Corp. The Traffic Service Corp. Transitier Truck Co	105
Transition Truck Co 210	211
Transitier Truck Co	201
Truck-Man Inc	321
Truscon Steel Co	617
The Union Metal Mfg. Co	324
The Union Metal Mfg. Co	211
Waterman Engrg. Co	-A
Jervis B. Webb Co	603
West Bend Equipment Corp	323
Westinghouse Electric Corn	613
Williford Manufacturing Co	499
Whiting Corn	207
White Chair P. Mrs. C.	520
Whiting Corp. Whitney Chain & Mfg. Co. Mathews Conveyor Co.	339
Matnews Conveyor Co	308
Wirebound Box Mfrs. Assoc	507
Yale & Towne Mfg. Co	26,
Wirebound Box Mfrs. Assoc. Yale & Towne Mfg. Co	130

The Powell Pressed Steel Co.431, 435

| Quality Lathe Dogs | Made of heavy malleable iron for maximum strength and long service. Standard Lathe Dogs has square load set acrew. | Friest shown apply to either alight | 1.05 | 1.06 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 |

KYLE-JOHNSON QUICK CHANGE



Write for Illustrated Literature & Price List

LATHE TOOL HOLDERS

Feature
Exclusive Height Adjustment
Ease of Operation
Longer Tool Life
More Production

KYLE-JOHNSON MACHINE CO. 1627 W. Pico Blvd. Los Angeles 15, Calif.

POWER AND FOOT OPERATED

For riveting, staking, stamping and similar operations on small light parts. Constructed to compensate for varigtion in thickness of the work and to deliver a UNIFORM BLOW AT EVERY STROKE.

SPRING & PRESSES

M-110 (illustrated) motor driven to eliminate fatique factor of foot operated press-similar press M-130, equipped to operate by compressed air.



Duplex Spline Millers - Medium Duty and High Speed Sensitive Dril ling Machines.

Send for Bulletin



THE TAYLOR & FENN CO. HARTFORD 1, CONN.

A Modern



MOTOR DRIVE FOR **EVERY MACHINE TOOL**

The Modern Motor Drive shown here fills an urgent demand for an easily mounted economical Punch Press Drive.

Utilizing the jackshaft principle, permitting the use of standard 1750 R.P.M. Motors.

Brackets for direct drive from motor to flywheel are also available from stock.

Write for catalog showing complete line of Modern Drives for other machine tool equipment.

MADISON ST.

ENGINEERING COMPAN

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Appointments and Promotions

Walter G. Tucker was elected Chairman of the Board of The Hydraulic Press Manufacturing Co., Mt. Gilead, Ohio, following the resignation of Colonel H. A. Toulmin, Jr. as Board Chairman, President and General Manager.





Walter G. Tucker

Paul C. Pocock

Paul C. Pocock, formerly Vice-President in Charge of Sales, was elected as Executive Vice-President and General Manager at The Hydraulic Press Manufacturing Company, Mt. Gilead, Ohio.

W. B. Peirce, president of the American Society of Tool Engineers, has announced his resignation from the Flannery Bolt Company, Bridgeville, Pennsylvania, effective August 15. He is retiring from his post, after 15 years of service as vice president in charge of research and development, in order to devote more time to the activities of the A.S.T.E. In the future he will be connected with the firm of G. C. Wood Company, manufacturers' representatives, 613 Clark Building, Pittsburgh.

The Arter Grinding Machine Company, Worcester, Massachusetts has appointed E. S. Drowne, Jr. their exclusive selling agent in Maine, New Hampshire, Vermont, Massachusetts and Rhode Island for their line of Rotary Surface, Cylindrical, and Internal Grinders.

Francis J. Sehn has been appointed Sales Engineer for E. W. Bliss Company, according to an announcement by E. A. Irwin, Vice-President. Mr. Sehn will service stamping manufacturers in the Detroit area.

B. H. Johns, for the past seven years manager of the St. Louis branch of Independent Pneumatic Tool Company, manufacturers of Thor portable power tools, has been appointed manager of the company's mining and contractors tool sales division, with headquarters at Chicago, according to an announcement by W. A. Nugent, vice president.

J. C. Axelson, President and General Manager of Axelson Manufacturing Company, pioneer Los Angeles machine tool manufacturers, has announced the resignation from that firm of George H. Lynn, effective October 24, 1947. Mr. Lynn, for eight years Washington Lathe Sales Representative for the Axelson Company, has accepted the position of Western Division Sales Manager with Niles Tool Works, and will have headquarters in Chicago.





George H. Lynn

Harold O. Hill

The American Welding Society (33 W. 39th St., N. Y. 18) has elected Harold O. Hill as its President for the year 1947-48. Mr. Hill assumed that office on Friday, October 24, at the conclusion of the 1947 Annual Meeting at the Hotel Sherman, Chicago.

Mr. Hill is Assistant Chief Engineer, Fabricated Steel Construction, of the Bethlehem Steel Company, at Bethlehem, Pennsylvania. Born in Ontario, Canada, he was educated at the University of Toronto, from which he received the degree of B. A. Sc. in Mechanical Engineering.

MULTI-DRILL for Production Drilling

9" DRILLING AREA

AVAILABLE WITH 2 TO 8 SPINDLES

- · Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to any hole pattern on or within a 9" circle; ½" minimum center distances; Drill sizes ½" to 3%"
- · Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

Locater arms are designed for fast, easy adjustment

Dependable Performance...
proven by industry



FITS ANY DRILL PRESS

COMMANDER MFG. CO.

4227 W. KINZIE STREET, CHICAGO 24, ILLINOIS



NOT TOO BIG FOR SMALL RUNS NOT TOO SMALL FOR BIG RUNS

90 TONS...
...INCLINABLE
MORE DIE SPACE
JOHNSON No. 8 PRESS

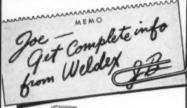
Standard Stroke, 4"...Special 9" Stroke Available...Depth of Throat Ram Center to Frame, 15"...Bed to Slide—Stroke Down Adjustment Up—Standard Stroke 211/8"...Strokes Per Minute, 44...Motor, 7½ H.P. Write for Catalog — 15 to 90 Ton Presses

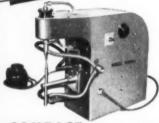
JOHNSON Machine and Thess Corp.



FLASH Bandsaw Welder

Beats brazing and butt-welding. Cuts set-up costs. Welds, forges and anneals up to %. 6-Point heat controls. 110 and 220 v. models.





COMPACT Spotwelder

Engineered for light gauge production spot welding. 3 KVA, capacity 18 gauge. Air operated, electronically timed, water-cooled. Only 21" high.

Weldex Inc.

7325 McDonald

DETROIT 10, MICH.

The Anderson Oil Company of Portland, Connecticut, makers of RustAvoid preservatives and Lusol cutting fluid, announces that Clyde A. Sluhan, for several years their Connecticut salesman, has been appointed the Manager of Industrial Sales. In this capacity he will direct the sales in the company's new expansion program following their successful participation in the Machine Tool Show at Chicago.





Clyde A. Sluhan

A. S. Terry

A. S. Terry of Grand Haven, Michigan, has been appointed sales manager of The Bellows Company, Akron, Ohio, manufacturers of Bellows Air Motors and "Controlled-Air" Devices. The appointment was made by L. F. R. Bellows, President, Mr. Terry was formerly head of the Detroit district office for Bellows.

The Cincinnati Milling Machine Co., manufacturers of Milling, Broaching, and Cutter Sharpening Machines, and Cincinnati Grinders Incorporated, manufacturers of Grinding and Lapping Machines, on October 1 began serving their customers in Indiana through their sales subsidiary, Cincinnati Milling and Grinding Machines, Inc., with a new Direct Field Engineering Office located in Room 218, Chamber of Commerce Building, 320 North Meridian Street, Indianapolis, Indiana

Arthur Meals and Charles Williams will work out of this new office which is under the supervision of Howard L. Pope, Manager of the Cincinnati-Indiana territory. Bruce Minturn will continue to work out of the Cincinnati Office.

J. A. Proven, vice president and general sales manager for Sterling Tool Products Company, Chicago, manufacturers of portable electric and air driven sanders, announces several advancements in the sales organization.

D. A. Hutchison, formerly district sales manager for the Illinois, Wisconsin, Indiana territory for Sterling, has been advanced to the position of assistant sales manager for the company. In his new position he will direct the company's sales activities with their domestic distributor organization. J. M. Warnimont, who formerly held the title of assistant sales and advertising manager, now becomes advertising manager, devoting his entire time to the advertising and promotional activities of the company.

V. H. Drummond, formerly district manager for the company in the Missouri, Kansas, Nebraska territory, has been promoted to district manager of the central territory formerly managed by Hutchison.

Jerry J. Howe, who formerly handled Sterling's sales under Mr. Hutchison to jobbers in the Chicago metropolitan area, has been transferred to St. Louis as district manager in the territory previously handled by Mr. Drummond.

Neil S. Rowe, after two year in Sterling's inside sales and service departments, takes over the Chicago territory sales which Mr. Howe relinquishes for his new position.

The appointment of Works Managers of the Chicago and Kalamazoo, Mich., plants of Ingersoll Steel Division, Borg-Warner Corp., was announced today by Roy C. Ingersoll, President of the division.

The Chicago post goes to Joseph A. White, formerly General Superintendent of the Columbia Steel Co. at Pittsburg, Calif. The Kalamazoo post will be filled by Milo F. McCammon, who has been Assistant Works Manager there for the last year.

Appointment of A. J. Jorgensen as chief mechanical engineer, and F. R. Gruner as mechanical research and development engineer of the Allis-Chalmers basic industries department (Milwukee), and B. H. Puerner as manager of the department's crushing, cement and mining machinery section, has been announced by G. V. Woody, manager of the basic industries department.

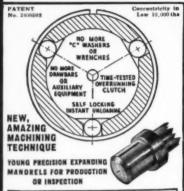
MAKE THE HARDEST GRIND THE EASIEST



With this new process abrasive grinding wheel, tool cutters and cutlery specialists are finding the answer to uniformity on their grinding problems... The abrasive power is the same from the first cut to thousandth cut....

Prompt delivery of abrasive wheels made to individual order and specification . . .

WOLF'S NEW PROCESS
ABRASIVE WHEEL, INC.
MERIDEN, CONN.



Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial productions boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART FRINT AND FORWARD FOR QUOTES.

YOUNG ARBOR CO. • PH. YE-9784
3257 Bradford Rd., Cleveland Hts. 18, Ohio



Catalog on request

TROYKE MFG. CO.
4422 Appleton St. Cincinnati 9. Ohio

Paul K. Carter has been appointed Vice President and General Manager of The Battels Corp. 20 East 33rd St. New York, 16, N. Y. Previous to this new association, M. Carter was manager of the metal and machinery department of United Atlas Co. Inc.





Paul K. Carter

M. E. Comstock

Wagner Electric Corporation announces the appointment of M. E. Comstock as Manager of its Electrical Division Branch Office in Boston. Mr. Comstock has been with the company since 1919; prior to his appointment he held the position of Sales Engineer for 28 years.

The company also announces that effective October 1, its Tulsa Sub-office is being transferred from the Houston Branch Office territory to the Kansas City Branch Office Territory. H. M. Furtney, who recently joined the Wagner organization, will be in charge of the Tulsa sub-office. A. W. Maas, formerly at Tulsa, has been transferred to the Philadelphia Branch Office.

New appointments to the sales division for Aro Tools have been announced by R. W. Morrison, sales manager of the Industrial Air Tool Division of the Aro Equipment Corporation, Bryan, Ohio

Robert Swayze, formerly of the Factory Sales Office, has been appointed Division Manager in Texas with headquarters in Dallas. Herbert Freeman and Merle Millor, Jr., have joined the Factory Sales Force. Ed. E. Allen, of Rochester, New York, has been appointed assistant to Mr. C. P. Enston, in the Cleveland territory. H. H. Higgins, of Montreal, Quebec, has been appointed Division Manager in the Montreal territory. Vernon C. Leif has been appointed to the Los Angeles office, under Mr. L. W. Lisle.

R. G. Sault, Vice-President of Porter Forge & Furnace, Inc., Somerville, Mass., was elected as the new President of the Metal Treating Institute at its 17th Annual Meeting held in the Graemere Hotel, Chicago.

Other officers elected were: Vice-President, Rowland H. Starr, Starr Heat Treating Company, Detroit, Michigan; Treasurer, R. W. Thorne, Bennett Steel Treating Company, Newark, N. J.; for a term of one year; also S. N. Clarkson, as Executive Secretary.

Trustees elected were Fred Heinzelman, Jr., Fred Heinzelman & Sons, New York, Charles H. Hewitt, The Dayton Forging & Heat Treating Company, Dayton, Ohio, and Paul J. Seitz, Commercial Steel Treating Company, Cleveland, Ohio for a term of two years.

At the meeting, which was attended by representatives of over fifty companies, from Texas, California, the midwest, New England, and Eastern States, a discussion of the relative advantages of atmosphere furnaces and salt baths for different types of heat treating services was presented by N. K. Koebel, Director of Research, Lindbergh Engineering Company, Chicago, Illinois, and H. J. Babcock, Research Engineer, Ajax Electric Company, Inc., Philadelphia, Pennsylvania.

Considerable time was also spent on the difficult problems of determining the costs of performing various heat treating services. This discussion was directed by A. D. Bach, of the New England Metallurgical Corp., Boston, Mass.

Four new appointments in the General Electric Company's Apparatus Department (Schenectady 5, N. Y.) have been announced by C. H. Lang, vice president and manager of sales of the department.

W. V. O'Brien has been named assistant general manager of sales; R. M. Darrin of New York, manager of Central Station Divisions, succeeding O'Brien; J. C. Miller, assistant to the manager of sales; and H. P. Bish, manager of Aircraft, Federal and Marine Divisions.

S. W. Bodman, Jr., Manager Industrial Sales Division, Swan-Finch Oil Corp., announces the appointment of Anthony J. Zino, Jr., as Assistant Sales Manager of the Industrial Sales Division with headquarters in the home office, R.C.A. Building, New York.



Designed to automatically regulate electrically operated equipment in accordance with changes in temperature, pressure, vacuum, fluid level or mechanical movement

CATALOG SENT UPON REQUEST



THE MOST IMPROVED TYPE IN MERCURY CONTACT SWITCH CONSTRUCTION. • MERCOID SWITCHES ARE NOT SUBJECT TO OPEN ARCING, NOR CAN CONTACTS PIT OR STICK. THEY ARE NOT AFFECTED BY DUST, DIRT OR CORROSION.

Write for Bulletin No. 500



THE MERCOID CORPORATION

Model 25 Hi-Duty Marking Machine

MARK YOUR PARTS

Permanently

PART NUMBERS HEAT NUMBERS CATALOG NUMBERS SERIAL NUMBERS

PATENT NUMBERS

MANUFACTURER — INSTRUCTION DATA — INSPECTION Positive, Permanent marking on your products assist prospects to order. Makes it easier to buy—new, repeats and repairs. Gives you

a definite record of pertinent data on each part produced. The Pneumatic marking machine illustrated is our HI-DUTY model 25 general purpose tool for short runs or production work. It operates from your shop air line and is one of numerous models built to

produce neat, permanent markings quickly on metal fabrications. We will be happy to make specific recommendations upon receipt of samples or prints of parts to be marked, showing approximate lettering, its location on the part, with required hourly production.

MARKED PARTS ADVERTISE IN THE RIGHT PLACE, AT THE RIGHT TIME



Send for complete catalog of our full line of marking Tools, Machinery and Equipment,

D. T. SCHMIDT,

1802 W. Belle Plaine Ave.

Chicago 13, III.



Available LITERATURE

AIR FILTERS

Explains application of replaceable type air filters for ventilating and air conditioning systems. Descriptions and illustrations of each type filter and instructions for maintenance and detailed engineering and installation data. American Air Filter Co., Inc., Dept. BB, 215 Central Ave., Louisville 8, Ky.

GRINDING WHEELS

Handbook recommends ordering procedure of grinding wheels. Double page is devoted to each manufacturing process (Vitrified, Silicate, etc.), tells grains and grades supplies. Tables include minimum diameter of spindles and maximum operating speeds, 35 pages. A. P. de Sanno & Son, Inc. Dept. BB, Phoenixville, Penna.

HOT PROCESS WATER SOFTENER

Describes equipment, operation and mechanism of operation. Tells system's reaction and sedimentation tank, raw water inlet regulating valve, spray heater, vent condenser, vacuum breaker, recording thermometer, and chemical feeding equipment and condensate and treated water storage. 11 pages. Allis-Chalmers Mfg. Co., Dept. BB, Milwaukee I, Wis.

SAFETY TOOL

Shows hand tools for hazardous situations (in presence of explosive liquids, fumes, gases or dust). Illustrations and specifications accompany each tool. 27 pages. Ampco Metal, Inc., Dept. BB, 1745 S. Thirty-Eighth St., Milwaukee 4, Wis.

PLANERS

Enumerates different types of planers, gives cross section drawing, special features, specification tables, series of pictures showing planers in use. 19 pages. Liberty Planers, Dept. BB, Hamilton, Ohio.

THREAD MILLING MACHINE

Specifications. Description of bed, car-

riage, cross slide, work head and work head drive, cutter head, tailstock, coolant equipment, automatic operating cycle. Several views show the machine from various angles. Also shows samples of thread produced on 4"x9" Thread Milling Machine. 11 pages. The Hanson-Whitney Machine Co., Dept. BB, Hartford, Conn.

DRILLING AND TAPPING MACHINE

Describes various parts of machine, pictures show dial settings for depth, feed and speed. Specifications. 4 pages. Barnes Drill Co., Dept. BB, 813 Chestnut St., Rockford, Ill.

PRODUCTION UNIT

Barnes No. 2 Production Unit Reaming, Tapping, Threading and Milling and Drilling. Pictures, specifications, together with description of operations. Barnes Drill Co., Dept. BB, 813 Chestnut St., Rockford, Ill.

GRINDING AND LAPPING MACHINES

Cylindrical grinders designed for precision grinding of small parts for operations within the 6" diameter range; piston rod grinder, universal grinders handling external, internal face or angular wheel slide operations, crankshaft grinders, cam and shape grinders, surface grinders of different sizes for plug gages, size blocks, etc. Specifications and illustrations included. 15 pages. Norton Co., Dept. BB, Worcester 6, Mass.

DRILLS

Shows various uses in photographs. Lists accessories and specifications. 4 pages. Mall Tool Co., Dept. BB, 7740 S. Chicago Ave., Chicago, 19, III.

GRINDERS

Depicts Geared Head Grinders and Direct Drive Grinders and the Mallflex 34 H.P. Grinder for 110/220 volt. Pictures, descriptions of uses and prices, 4 pages. Mall Tool Co., Dept. BB, 7740 S. Chicago Ave., Chicago 19, Ill.

PORTABLE TOOLS

Saws for light and heavy jobs, surface and door planes and drills of varying capacity. 4 pages. Mall Tool Co., Dept. BB, 7740 S. Chicago Ave., Chicago 19, 111.

UNIVERSAL HYDRAULIC PRESS

Portable and develops up to 200 tons pressure. Specifications and line drawings. 8 pages. Rodgers Hydraulic, Inc., Dept. BB, St. Louis Park, Minneapolis 16, Minn.

SPECIAL MACHINERY

Swaging and Drilling machines. Pictures of machines with description below each. 4 pages. Langelier Mfg. Co., Dept. BB, Providence 7, R. I.

WEIGHT MEASURING METHOD

For use in oil drilling, through the use of a wire line anchor with a hydraulic pressure transformer to transmit pressure to operate the weight indicator. 4 pages. Illustrations and text. The National Supply Co., Box 899A, Toledo 1, Ohio.

LATHE TOOLS

Shows pictures of tools and also tools in use. Tools include straight turning holder, side forming tool holder, drill holder, boring bar holder, knurling tool holder and heavy duty turning holder. 4 pages. Kyle-Johnson Machine Co., Dept. BB, 1627 West Pico Blvd., Los Angeles 15, Calif.

PNEUMATIC COMPARATOR GAGES

Contains discussions of basic principle, quality control and of the various types of Gages, C, R and F. Pneumatic Comparators for special applications and ordering information conclude the bulletin. Photographs, diagrams, and cross sectional drawings are liberally used. 24 pages. Moore Products Co. Dept. BB, H & Lycoming Streets, Philadelphia 24, Pa.

CUTTING FLUIDS

Application of oils for cutting, grinding, drawing, quenching and tempering, and other phases of metalworking and industrial lubrication. Other sections include metal cutting mechanisms, selection of cutting fluids, tables of standard steel specifications, and marking system chart for grinding wheels. 72 pages. D. A. Stuart Oil Co., 2739½ South Troy St., Chicago 23, Ill.

CONTROL VALVES

Cross cut drawings of "V" Port Seats, illustrating direct acting and reverse

acting, as well as parts lists for both types. Includes valve capacity chart for steam, liquids and gases, and maximum line working pressure ratings with zero back pressure in line. 19 pages. The Sinclair-Collins Valve Co., Dept. BB, 454 Morgan Ave., Akron 11, Ohio.

SMALL TOOL GRINDER

Series of pictures show applications for the grinder such as thinning web of large or small drill, sharpening a button die, an acorn die, or a circular form or straight tool, grinding flute of a large tap. Special features of the machine are the rapidity with which wheels may be changed—9 seconds—, storage space in base for mounted wheels or additional equipment. 4 pages. Corlett-Turner Co., Dept. BB, 1001 S. Kostner Ave. Chicago 24, Ill.

DESIGN SERVICE

Picture of home office and descriptions of branch offices. Application engineering with case history presented. 21 pages. Design Service Co., Dept. BB, 444 Madison Ave., N. Y. 17, N. Y.

MATERIALS HANDLING EQUIPMENT

Covers power fork truck, power jacklift; stacker and crane; hand operated lift truck; and floor truck, skid platform and storage rack equipment. Pictures and description. 86 pages. Lewis-Shepard Products, Inc., Dept. BB, 320 Walnut St., Watertown, Mass.

BROACHING MACHINES

Discussion of horizontal and vertical broaching machines and material on modern broaching. Pictures show end products as well as machines. The Lapointe Machine Tool Co., Dept. BB, Hudson, Mass.

GRINDER, DIE AND MOLD

Sanding and polishing accessories, rotary files with mounted points, spindles, core, casing and countershaft data. 6 pages. R. G. Haskins Co., Dept. BB, 615 S. California Ave., Chicago 12, III

AUTOMOTIVE EQUIPMENT

Portable equipment for the body and fender shop, attachments and accessories. Tire buffing accessories and equipment for the tire repair shop. 6-page folder. R. G. Haskins Co., Dept. BB, 615 S. California Ave., Chicago 12, Ill.

CENTERING MACHINE

Explain operation of machine. Through line drawings shows how to center pieces with irregular shaped ends. Specifications, regular and additional equipment possible. The Hanson-Whitney Machine Co., Dept. BB, Hartford, Conn.

PRESSES

Buletin 109-B describes assembling press, straightening press, knee-type press, open-side press, multipress. Last half of booklet confined to engineering facts and figures. 21 pages. The Denison Engineering Co., Dept. BB, Columbus 16. Ohio.

GENERAL MACHINERY

Lists machines manufactured by various divisions and shows pictures of a few of the machines. Six-page folder. General Machinery Corp., Hamilton, Ohio.

SOLENOID CONTACTOR

Tells about construction, operating coils, main contacts, auxiliary contacts, maintenance and inspection. Dimensions and ratings recommended by the National Electrical Manufacturers Association. Ward Leonard Electric Co., Dept. BB, Mount Vernon, N. Y.

POWER SCREWDRIVERS

Shows different types of machines and also machines in use. Sectional view shows inside arrangement of parts. 11 pages. R. G. Haskins Co., Dept. BB, 615 S. California Ave., Chicago, Ill.

PROFILOMETER

Shows use at several plants with pictures and description. Tell advantages and how the product works. Physicists Research Co., Dept. BB, Ann Arbor, Mich.

MAGIC CIRCLE

Tells about Cincinnati Shapers, Press Brake and Shears. Theme is accuracy of machines. 12 pages. 4"x6". The Cincinnati Shaper Co., Cincinnati 25, Ohio.

AIR-HYDRAULIC SHEAR

One page describes shear by means of picture, dimensions, specifications and description of parts. Acme Equipment Co., Inc., Dept. BB, 126 S. Clinton St., Chicago 6, Ill.

SOCKET SCREWS

Folder gives specification and list prices per 100 screws, socket pipe plugs, screw key seats and stripper bolts. The Holo-Krome Screw Corp., Dept. BB, Hartford 10, Conn.

THERMOCOUPLES

Four sections describe service, aircraft division, industrial uses, and wire applications. Description accompanies illustrations, line drawings and tables. 28 pages. Thermo Electric Co., Dept. BB, Fair Lawn, N. J.

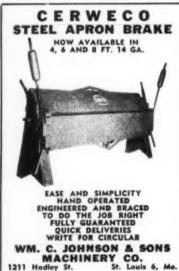




An Arbor Press for every need, ranging from ¼ to 30 tons capacity, both hydraulic and mechanical types. Write for Catalog G.

GREENERD ARBOR PRESSES





MULTIPRESS MIDGET

Describes basic unit, optional equipment, bases, spacer blocks, pressure gauge, power supply. Dimensional drawings include Multipress Midget, base plates and accumulator assembly. The Denison Engineering Co., Dept. BB, Columbus 16, Ohio.

ROLLER BEARINGS

Isometric drawing of tapered roller bearing shows spherical roller head contact. Emphasizes Spher-O-Honed Bearing feature. 2 pages. Bower Roller Bearing Co., Dept. BB, Detroit 14, Mich.

GRINDERS

Bulletin No. 120. Picture and brief description of grinders, magnetic chucks, wheel dressers and comparator. Hanchett Mfg. Co., Dept. BB, Big Rapids, Mich.

PORTABLE POWER TOOLS

Saws with various cutting capacities, blades, planes, different model drills-14", 5-16", 3_k", 1₂", 7_k" capacities—screwdriver, sanding pad attachment, etc. Picture of each, price, dimensions and specifications, 31 pages, Mall Tool Co., Dept. BB, 7740 S. Chicago Ave., Chicago 19, Ill.

WHEEL DRESSER

Tells why it was developed, how it is designed and instructions for operating. Pictures show closeup of Tru-Matic Wheel Dresser, one picture in use and the other a line drawing of the product. 2 pages. Erickson Tools Divn., Dept. BB, 2309 Hamilton Ave., Cleveland 14, Ohio.

LATHE, FULL AUTOMATIC

Includes information on operation, typical jobs (in line drawings), construction details, additional equipment, specifications. Also description and picture of Full-Automatic Centering Machine. 7 pages. Pratt & Whitney, Dept. BB, West Hartford 1, Conn.

HYDRAULIC OVERLOAD PITMAN

Includes specifications, facts and operation. Dimensions required for installation include a line drawing and a form to fill in for company press specifications. Dayton Rogers Mfg. Co., Dept BB, 2835—12th Ave., So., Minneapolis 7, Minn.

DRILLHEAD SPECIFICATIONS

Data sheet explains operations by means of text and line drawing. 2 pages. Zagar Tool, Inc., MT-8, 23880 Lakeland Blvd., Cleveland 17. Ohio.

Put Your Stop Watch

on NICHOLSON EXPANDING MANDRELS

Test the time-saving possibilities of these widely used precision tools. Not infrequently. time studies show operations are completed in less time than



BULLETIN 1043 SHOWS YOU HOW TO Save Set-Up Time · Promote Precision

ing for or turning a solid arbor. Set of 14 does work of 209 solid

was formerly consumed in look- arbors. For all bores 1/2" to 7". Hardened tool steel. Sold singly or in sets.

W. H. NICHOLSON & CO., 117 Oregon St., Wilkes-Barre, Pa.

Valves . Traps . Floats . Steam Specialties



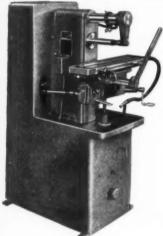
die work, jig and model making, drilling, reaming, milling. Releases larger machines for work better suited to their capacities. Easy set-up, quick changeover . . . velvet-smooth feed, eight spindle speeds from 275 to 4250 rpm . . . simple, direct micrometer setting.

> FOR COMPLETE INFORMATION. WRITE FOR BULLETIN.

LINLEY BROTHERS CO., BRIDGEPORT 1, CONNECTICUT

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

----No. 3 HAND and POWER FEED MILLING MACHINE



FEATURES

- 141/2" power feed
- · Hand feed for short milling cuts
- · Built in coolant system
- · Totally enclosed V belt motor drive
- Precision roller bearing spindle and counter shaft
- Overall table size-61/2" x 22"
- · Hand scraped fits
- · Low price-prompt delivery

"The best buy on the market"

This modern designed milling machine is suitable for a wide variety of light production operations. Every shop should have one.

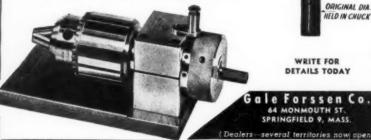
> Certain Sales Territory Still Open Approximate weight 800 lb.

MILLER & CROWNINGSHIELD GREENFIELD, MASS.



GRINDS THIS **PUNCH FROM** SOLID STOCK IN ONE SETUP

On The Surface Grinder with a OR TAPERED STA-GA-CO Rotary Grinding Attachment

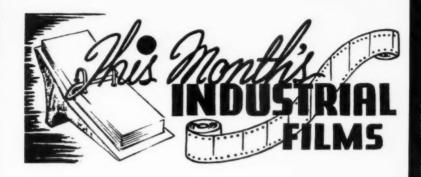


INDEXING WITHIN - 2 MINUTES DEAD -CONCENTRIC ROUND WITHIN .00005

> CUT-OFF ORIGINAL DIA HELD IN CHUCK

WRITE FOR DETAILS TODAY

e Forssen Co. 64 MONMOUTH ST. SPRINGFIELD 9, MASS



SURFACE BROACHING

The Lapointe Machine Tool Co. Hudson, Massachusetts

18 minutes. Sound. 16 mm. Kodachrome. Obtainable from the Lapointe Machine Tool Co.

The versatility of the broaching process speeds up production of modern articles from textile looms to typewriters. Such articles as wrenches, pliers, motor cylinder blocks, automobile bearings and typewriter parts are fabricated in this film with the cooperation of various major industries to demonstrate advantages of broaching in modern production.

In the fabrication of Stevens-Walden wrenches, six broaches perform sixteen separate operations to produce a finished product directly from the original forging, made possible by two tip-up fixtures. Broaching of plier halves depict inexpensive mass production of precision parts. Three operations—truing the face, cutting serrations and forming of contours on these—are performed by a single broach.

Automobile engine bearings are broached to such close tolerances that the mirror finish obtained eliminates the need for a "breaking-in" period. Maintaining an overall wall thickness of one tenthousandth of an inch on the entire radius of the bearing achieves this result. A single machine broaches both 6-and 8-cylinder blocks as they come along the Pontiac assembly line, eliminating cumbersome handling previously involved in separating the two sizes for machining.

The range of broaching has expanded



from the early days when it meant little more than the cutting of simple keyways. Today its applications are many, and are constantly increasing.

AN INTRODUCTION TO DIE CASTING

The New Jersey Zinc Company 160 Front Street New York 7, N. Y.

30 minutes. Sound. 16 mm. Kodachrome. Obtainable from The New Jersey Zinc Company

The die casting processes presented in the picture provide an explanation of production methods and equipment and examples of die casting applications.

For instance, animated drawings of die

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

casting machines show the function of the more important elements in die casting operations, and a typical die casting die illustrates the function of its various

parts and steps taken in a die casting die shop. Testing methods are shown by development and evaluation of die casting alloys. The last half of the film demonstrates typical and unusual applications of die castings in which zinc, aluminum, magnesium and brass alloys are shown.

A 24-page booklet supplements the film and provides technical information not lending itself to film treatment. Quantities of the booklet are supplied wherever the film is shown.

Industrial groups, tool and engineering societies and engineering colleges may secure the movie for showing without charge.

GREENLEE TRANSFER MACHINE

Greenlee Bros & Co. Rockford, Illinois

15 minutes. Black and white. Sound. 16 mm. Obtainable from Greenlee Bros. & Co.

The movie centers about the operations of four individual transfer units built to machine 75 automobile cylinder blocks per hour at 80% efficiency. Shown for the first time at the Machine Tool Show, this movie demonstrates how individual machine heads operate, and how the work



are production necessities in any plant, for economical, speedy finishing, polishing, de-burring or lapping small parts.

There is a size and type for your particular needs. For complete information

Write for Catalog 440

The Schauer Machine Co.

2064 Reading Rd. Cincinnati 2, Ohio



pieces are transferred, rotated, positioned, clamped, and machined in a continuous automatic cycle.

Prints of the new film will be available on a loan basis to interested technical groups, who write on company letterhead. Information should be forwarded stating the approximate date the film is desired and the estimated number of persons who will view the film.



Double Value ... in 2-in-1 DOODUCTIMETEDS

NEW design of double deck Model "N" units offers smooth action and high speeds . . . both rows count simultaneously. Available in Stroke style, rear or end drive Rotary . . . and Predetermined Stroke and Rotary models.

Above model is Predetermined Stroke . . . top row is the Predetermined Unit for controlling pre-set quantity runs . . . lower row is totalizer for registering daily, weekly or monthly totals. Ideal for production control . . . accumulating totals for definite periods . . . computing total piece work earnings.

> Wide range of applications . . . Send for descriptive literature!

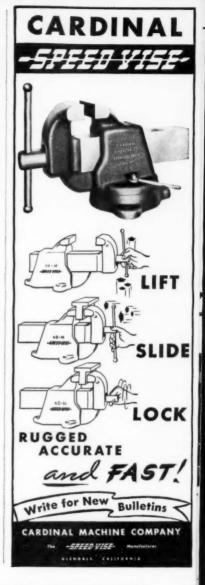
MFG. COMPANY

1928 N. Buffum St.

128 Orange St.

Milwaukee 1

PRODUCTIMETERS Providence 3, THE SPEEDOMETERS OF INDUSTRY TO



Maximum Production . . . in Chucking and Indexing



With the new Decrborn Automatic Indexer connected to a Decrborn Chucking Fixture: chuck is closed automatically: indexed the required number of times automatically: chuck is opened automatically: piece is knocked out automatically.

When used with the Dearborn Degree Indexing Fixture it ean quickly ha set to Index any number of degrees from 30° to 90° at one indexing and then knock out, or it cam he set to index from no degrees to 90° and then not knock out.

WRITE FOR FURTHER INFORMATION

J. W. DEARBORN

ANSONIA CONN

"The Outstanding Basic Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from on speed to another. Rotoflex machines are powered with totally enclosed ballbearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from \(\frac{1}{2} \) to 3 H.P. available with suitable attachments for your specific requirements.

Distributors in all principal cities Ask for Bulletin No. 43 and Catalog No. 30



N. A. STRAND & CO.

M-5



MACHINE and TOOL BLUE BOOK

January, 1948



COMPRESSED AIR HANDBOOK

Published by Compressed Air and Gas Institute, N. Y., N. Y. 1947. 400 pages. Stiff-backed, simulated leather cover, gold embossed. \$3.00.

"Compressed Air Handbook" has been published to meet demands for a reference text on applications, installation, operation and maintenance of compressing equipment and air-powered tools of all types. In addition to making available a mass of new and original data not heretofore published in a single volume, the Handbook contains, in revised and improved form, all of the standard reference material formerly published as "Trade Standards". Included are definitions, test standards and numerous basic tables and formulae.

Table of Contents includes Typical Applications of Compressed Air and Gas. Representative Types of Compressor Installations, Portable Air-Operated Tools and Rock Drills, Engineering the Compressor Installation for Maximum Efficiency and Compressed Air Engineering Data and Test Procedure. The chapter on Portable Air-Operated Tools and Rock Drills embraces a discussion on portable tools and accessories and increased production, and a discussion on rock drills and accessories, such as hand held rock drills, drifter drills, etc.

The object in editing "Compressed Air Handbook" was to provide a comprehensive volume of reference data which would meet technical and engineering needs and, at the same time, serve the layman and student with information on the wide versatility, flexibility and utility of modern compressed air power.

"Compressed Air Handbook" represents the collective knowledge, experience and thought of the 19 member companies of the Compressed Air and Gas Institute, and was compiled over a two-year period as a joint activity of the Institute's educational and technical committees.

ILLUSTRATED JIG-TOOLING DICTIONARY

By Torger G. Thompson and Ross A. Peterson. The MacMillan Co., 60 Fifth Ave., New York. 1947. 349 Pages. \$7.50.

Over 1000 tooling terms, covering common and special types of tooling and tooling procedure, are illustrated by functional drawings and described by an explanatory legend. Fields related to tools, parts and operations are represented also — mathmetical procedures, formulas, the properties and treatment of metals, standards and basic dimensions, plastic forming processes, welding, technical drawing and blueprints. Special terminology applying to industries like aircraft manufacturing and shipbuilding is also included.

Explanations of latest precision equipment includes specific functions, proper use and methods of obtaining and interpreting calibration results. Tooling procedures, like typical jig drill construction or Kirksite blank and pierce dies are covered by groups of drawings, some groups including as many as 16 drawings.

Data are taken from design and construction of jigs, tools and fixtures actually in use in industry. Cross-references enable the user to find further information and reference tables in the appendix including tables of standards mathematical tables, conversion tables etc. Headings under which items are



In manufacture of special tools for maximum production the skill of the tool craftsman is the most essential element.

Andersons, Inc., specializing in precision tools and fixtures are so manned and equipped as to assure the best in tool design and craftsmanship.

Your inquiries for special tooling are solicited and will receive prompt efficient service. Let us help you solve your tooling problems.

GAGES, FIXTURES, SPECIAL TOOLS

FORM TOOLS—DOVETAIL AND CIRCULAR MILLING CUTTERS—END MILLS—REAMERS

Write Us or Phone Buckingham 3417

Andersons, Inc.

2333 NELSON ST., CHICAGO 18, ILL

classified represent common terminology, even though some of the terms vary from plant to plant.

This volume is not intended as a book of instructions, but rather as a handy source of reference for those engaged in toolmaking and allied fields.

PRINTED CIRCUIT TECHNIQUES

By Drs. Cledo Brunetti and R. W. Curtis. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 1947. 43 pages. \$.25.

The methods of applying wiring and circuit components directly to an insulated surface, thus combining ruggedness with a high degree of miniaturization, are presented under the topics Painting, Spraying, Chemical Deposition, Vacuum Processes, Die-Stamping, and Dusting. Performance and application details as well as precautions and limitations are discussed. Many applications and examples are given, including printed amplifiers, transmitters, receivers, hearing aid subassemblies, plug-in units, and electronic accessories. A section on comparative performance of printed circuit elements is provided, while a bibliography covering processes, patents, applications, and other relevant matters is included as a supplement.

By means of the printing process the conventional electronic circuit—characterized by a maze of wires, resistors, inductors, and condensers—is replaced by a compact circuit printed on a small flat plate, eliminating much of the third dimension and making it simple to check and repair. Since the war the art has advanced to the point that complete circuits may now be printed not only on flat surfaces, but on cylinders surrounding a radio tube or on the tube envelope itself.

The new techniques simplify production methods and offer cheaper, stronger, more compact, and more uniform electronic equipment, thus decreasing time and cost in assembly and inspection, as well as reducing purchasing and stocking problems. Specific applications lie in the fields of electronic control circuits, electronic instruments, standard radio and television sets, pocket radios, personal radio telephones, miniature hearing aids, and meteorological instruments.

MILLING - BURKE - MACHINES



Above: No. 4 Motor Driven Milling Machine. Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

FOR SMALL, DIFFICULT WORK ON A PRODUCTION BASIS

GENERAL SPECIFICATIONS						
Mach. No.	Working Surface of Table	Longitudina) Feed	Traverse Feed	Vertical Feed	Maximum Distance between center of spindle and table	
1	31/2×12	8	3%	41/2	51/4	
2	3%x16	6	2	41/2	5	
3	31/2×12	8	3%	71/2	71/2	
4	3%x16	8	3	8	8	

Write TODAY for complete information, specifications, attachments not shown in above table.

BURKE MACHINE TOOL CO. Conneaut. Ohio 510 Sandusky St.

As Every Machinist Knows — IT PAYS to REAKAGE REDUCE TAP

Does the job in a fraction of the time reguired for hand tapping. Because the work is dependably straight and square, tap breakage is practically eliminated — and gone are the wasted hours of trying to pry broken taps out of dies. Equipped with seven Adaptors, ranging from 8-32 to 1/2", it takes care of 95% of all tapping requirements. (Taps not furnished). \$52.50 F.O.B. Minneapolis. Ask your mill supply house, or write Dahlstrom Mig. Co., 416 South 6th St., Minneapolis 15. Minnesota.

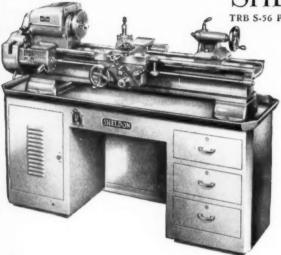


Dahlstrom TAP GUIDE • 12" x 6" x 14"
• Fastens to wall or bench

- · Anyone can operate it

SHELDON

TRB S-56 PRECISION LATHES



Production Capacity

---comes ready for production

The new TRB S-56 Sheldon Precision Lathes have the speed, stamina and capacity for general production use—11½" swing, 13½" hole thru spindle, 1" collet capacity. They will operate safely at high speed and work to the very closest tolerances, for spindle bearings are "Zero Precision" tapered roller bear-

ings, the most accurate obtainable.

They will take a "healthy cut" too, because they have double V-belts to the spindle to assure full power from their 1 h.p. motor at the point of work. They come ready for production—no breaking-in period is required—start earning from the day received.

Write for Catalog of Sheldon and Sheldon-Vernon.

SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes . Milling Machines . Shapers 4224 N. KNOX AVENUE . CHICAGO 41. ILLINOIS. U. S. A.

WHAT'S NEW IN METALWORKING

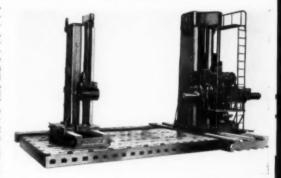
HORIZONTAL BORING, DRILLING, AND MILLING MACHINES ADAPTABLE FOR HEAVY OPERATIONS

A distinguishing characteristic of the new Giddings & Lewis series 570-F Horizontal Boring. Drilling, and Milling Machines, is their adapt-ability in handling large and unwieldly weldments and castings in iron and steel. According to G & L engineers, the unusual flexibility of the 570-F permits holding these out - of - the - ordinary workpieces, and bringing hard-to-reach surfaces within range of the column, headstock and spindle travel. This capacity is enhanced by the use of attachments, con-tinuous feed facing heads, and other ac-

cessories.

In the floor-type machine, illustrated, a compound angle base may be used to give the column two possible movements at right angles to each other; this permits reaching surfaces at various depths in the work, while maintaining maximum cutter rigidity. Table type machines are claimed by the manufacturer to provide even greater flexibility on work within their range. The planer type 570-F units combine the work-holding capacity of a floor type machine with the flexibility and accuracy of the table type.

Over 100 spindle speeds from 2 to 400 rpm, are available on the 7" dia. spindle. The longitudinal travel is 60" on the main spindle, 15" for the auxiliary, 2½" spindle. The range of the 21 table feeds covers from .005" to .250", and from .010" to .500" per revolution.



Another improved unit of the Giddings & Lewis Co. is the Model 230 Portable & Lewis Co. is the Model 230 Portable & Lewis Co. is the Model 230 Portable was in the performs precision boring, drilling, tapping, milling, and facing operations. This unit (see cut) is for use in restricted areas, on parts which cannot be moved to machine tools, such as in the repair of stationary machinery, and as an auxiliary unit for large work placed on floor type horizontal boring, drilling, and milling machines. The cutter may be approached to surfaces in almost any location by means of the spindle travel, up-and-down tilting of the headstock, vertical travel of the headstock on the column, 360° column rotation, and the horizontal column movement on the runway.

According to the manufacturer, production jobs can be handled efficiently, since the wide range of speeds and feeds permits a variety of milling and facing operations, and even greater capacity is obtained through use of facing heads and

angular milling attachments.

The Model 230 is not limited as to work size, provided that it can be placed in a suitable operating position. It can easily



be moved by crane to the work, and can be operated inside tanks, and large open-end work pieces.

Complete specifications and technical data on both the Model 570-F series, and the Model 230 may be secured upon re-

Giddings & Lewis Machine Tool Co., Dept. BB

Fond du Lac. Wisconsin.

TAP BREAKAGE MINIMIZED BY USE OF

NEW BURG TOOL HOLDER
"Tool-Flex" Neoprene mounted, non-releasing, pull-out type flexible tool holder, a new product of the Burg Tool



Manufacturing Co., is claimed to increase the efficiency of tapping on screw machines. The Neoprene mounting prevents binding, absorbs shock, keeps taps centered, permitting them to follow the original hole, thus simplifying set-up and preventing tap breakage due to misalignment. The pull-out action of the holder compensates for any difference in cam motion and tap travel, prevents torn threads and broken taps.

Since there are no parts to wear on this model "Tool-Flex", long and accu-rate life is more assured for these tools. All holders are made of alloy steel heat treated, and ground to close tolerances. Catalogues will be furnished on request

Burg Tool Manufacturing Co., 5028 W. Jefferson Blvd., Dept. BB Los Angeles 16, Calif.

HEAVY DUTY 8-TON CAPACITY DIE TRUCK

A new heavy duty die truck has been announced by the Palmer-Shile Co. This equipment is designed for high production shops and factories where heavy dies, forgings, jigs or fixtures are con-tinually moved from one location to another. Roller conveyors can be put on the bed of the truck to facilitate materials handling.



The truck is constructed of heavy, special fabricated steel plate, welded throughout. Each truck reatures a fifth wheel or caster type construction, with Timken Thrust Bearings used exclusively. It is furnished with rubber-tired or metal wheels equipped with Timken Taper Roller Bearings. The track shown in illustration is rated at eight tons. For further information, write:

The Palmer-Shile Co., Dept. BB 16021 Fullerton Ave., Detroit 27. Mich.

240



Matco COLLET HEAD

- For precision milling and grinding angles, flats, tapers, hexagons and keyways.
- Attachments available for radius and angle wheel dressing and for sharpening milling cutters.

EXTRA FEATURES:

Lever action collet closer. Tail stock for accurate centering. Hardened and Precision Ground 24 Tooth index Plate. 90° Vertical Setting Angle. Precision Roller Bearings. Takes 5C Collets up to 1" capacity. Base 4-34" x 71/2". Height 61/2". Weight 21 lbs.

Write for catalog for complete line showing many helpful and time-saving set-ups.

MATCO TOOL COMPANY

2830-36 W. Lake Street Chicago 12, Illinois

Est. 1934 . . . Mfrs. complete line precision vises & wheel dressers_



DIAPHRAGM CHUCKS

Look, a high speed, precision chuck with no parts to wear out! Result: Maximum accuracy, minimum maintenance! Because the Woodworth design assures the ultimate in concentric chucking. Obviously, it will solve your precision chucking problems, as it has already for large manufacturers of gears and other production parts. Send your precision chucking problems to us—at no obligation.

MECHANICALLY OR AIR OPERATED

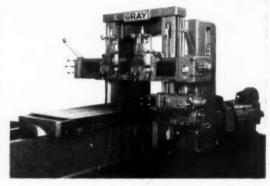
ACCURACY YOU CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION • 1300 E. NINE MILE RD., DETROIT 20, MICH.

GRAY NON-METALLC WAYS ACCELERATE PLANER REVERSAL

new development which has eliminated the cutting and scoring of the ways, and extended the accurate life of Gray ma-chine tools has been put into use by the G.A. Gray Co. The bearing surfaces consist of laminated plastic plates secured to the cast iron member by laminated plastic pins. Since properly lubricated plastic plates attain negligible friction, table loadings are able to be greatly increased, at the same time minimizing wear on the ways. Since the plas-tic material acts as an insulator, a little frictional heat passes into the structural members of the machine.



The Gray Lubrication of planer ways has been devised to meet the exacting requirements imposed by the high speeds and quick reversals of the new variable voltage driven Gray planers (see cut). A space-saver drive cuts down on floor

space by placing the motor behind the column and close to the planer bed which also protects the motor from metal dust, thereby reducing maintenance.

Fewer gears, shafts, and bearings are required to transmit the power than in

WHEN YOU BREAK A TAP YOU NEED A

WALTON TAP EXTRACTOR

Prices range from \$1.50 to \$2.20 for the popular sizes.

The fastest, easiest, safest and most economical way to remove a broken tap from the work is with a WALTON EXTRACTOR.

No Mangled Threads— No Scrapped Work— No Frayed Nerves

> Write for Folder No. 12 and the 30-Day Free Trial Offer

THE WALTON COMPANY Hartford 3, Conn.



the conventional drive arrangement. The motor drives the simplified gear train through a large diameter tubular floating shaft which has flexible connections at both ends, similar to the propeller shaft of an automobile; this type construction eliminates vibration, wear, and strain due to the misalignment of the motor, according to the Gray engineers.

Complete information on these new developments is available upon request

The G. A. Gray Co., Dept. BB 3611 Woodburn Ave., Cincinnati. Ohio

GENERAL PURPOSE, LIMITED INPUT, PORTABLE ARC WELDERS

Four new general purpose, limited input, transformer-type welders have been added to the "Job-Tested" Trindl Welder Line for use on single phase, rural, and other limited capacity power lines.

Designed to conform with both REA and NEMA specification requirements, these welders are approved by Underwriters Laboratories, and are available both with and without power factor correction in output ratings of 130 and 180 amperes. Units are provided with headshield, electrode holder, weiding, ground and power cables, wall recept: cle, a supply of assorted welding rods, and simplified welding and operating instructions, as standard equipment.



These new models, 130B, 130C, and 180B (illustrated) and 180C, are recommended by the manufacturer for automotive and general industrial maintenance and production welding; they are claimed to be suited to all types of repair work.

The units have 36 secondary output



SAVE Labor

Eliminate heavy lifting. Cut handling Table costs.

swivels and locks in any position. Can be varied 151/2" by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send TODAY for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO. 112 Webster St.,

Dayton, Ohio





Immediate Delivery!

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N. J.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

QUEEN CITY GRINDERS COST LESS

GIVE LONGER LIFE BETTER PERFORMANCE



It takes a top-quality grinder to stand up under the variety of work that pours through a shop day after day. Queen City Grinders are noted for their durability, freedom from downtime, and dependable performance. And they cost considerably

Illustrated is the I H.P. Heavy Duty Queen City Floor Grinder (No. 3F), equally adaptable to fine or heavy work. numerous safety and operating features. Send for eatalog complete with prices and details.

Agents in Principal Cities

QUEEN CITY MACHINE TOOL CO. 217 E. 2nd St., Cincinnati 2, Ohio

current heat stages, ranging from 20 amps to their rated maximum secondary out-puts of 130 and 180 amps, respectively. Class B spun glass type insulation is used throughout. A sloping Vernier-type consteel, rackle-finish cabinet, mounted on casters, are among the equipment's features

For complete information, write to: Trindl Products. Ltd. 17 East 23rd St., Dept. BB, Chicago 16, III.

MERCONTROL MERCURY SWITCHES HAVE STABILITY AND OVERLOAD CAPACITY

Hermetically sealed by a patented process of fusing metal to ceramic, these small Mercontrol switches are especially adapted to explosion-proof areas; the metal enclosure provides safe and hazard-free operation in atmospheres where switch - sparking constitutes a danger. They provide mercury-to-mercury contact without arcing, pitting, or burning, and will operate at 110 and 220 volts AC or DC in an ambient temperature of 100° C. Pressure of the hydrogen inside the switch to quench the arc is 28 psi above atmospheric pressure.



Only 11/2" long, and 1/2" in diameter. these switches may be installed in standard cartridge-fuse holders. Mercontrol switches are also available in a unit 1" long, $\frac{1}{2}$ " in dia. They are available in 5, 10, 15, and 20 amperes. A descriptive bulletin is available upon request to:

Mercontrol Inc., Dept. BB 278 Pearl St. New York 7, N. Y.

MODEL No. 16 "SPECIAL"

CONSTRUCTED AS PER SPECIFICATIONS OF U. S.

NAVAL AIRCRAFT FACTORIES

BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table: Model E.L.—12" Table. Model No. 14—14" table and heavy pedestals for all our machines.

HARVEY MFG. CORP.

Phone CAnal 6-5170



BEWARE OF

IMITATIONS

Registered U. S. Patent Office

CUT DIE-MAKING COST

WITH

CERROMATRIX

Leading manufacturers in this country and Europe use the fast, accurate Cerromatrix Method of locating punches in relation to dies, without machining non-working surfaces to close dimensions. Dies and punches permanently secured for long runs.

Attach coupon to your letterhead to receive 36 page Cerromatrix Manual.

CERRO DE PASCO

Dept. 7 . 40 Wall Street . New York 5, N.Y.



Cerro De Pasco Copper Corporation Dept. 7, 40 Wall Street New York, N. Y.

Please send me a copy of your Cerromatrix Manual.

NameTitle

Company City State....



The Drillet Jig Box is a six sided leaf type jig for all phases of drill press operation. Tooling expense can be reduced as much as 75%. All that is necessary is for toolmaker to locate part and insert drill bushings. Eliminates preliminary steps required in building and squaring jig. Side plates, end plates and leaves are replaceable for immediate delivery. Before investing hundreds of dollars in your toolmaker's time—Write for Literature and Prices.

Full Scale Tracing Templates with Orders on Request.



HYPERMATIC HIGH SPEED PUNCH PRESS ATTAINS 1800 STROKES PER MINUTE

The new "Hypermatic" High Speed Punch Press has been recently introduced by Lempco Products, Inc. The manufacturers claim the following advantages for this unit: large production increases which reduce manufacturing costs, as well as increasing savings in material costs; longer tool life; complete operator safety; versatility in changes of stroke, feed pitch; long wearing qualities under severe operating conditions. Speeds ranging up to 1800 strokes per minute, with stock accurately registered, are commonplace with the rew press, according to Lempco engineers.

The "Hypermatic" employs the use of a rotary motion in actuating the dies. Four crankshafts are used; the upper two, rotating clockwise, drive the upper die head; the lower pair are counterclockwise in motion, driving the lower die head. The die members mounted in Lempco Anti-Friction Die Sets, are



mounted between the two die heads, the punch holder being fastened to the upper head, and the die holder to the lower one. The punches and dies thus have the same rotary motions as their respective die heads, closing and opening in each cycle of the crankshafts, giving the advantage of cutting the stock while it is in horizontal motion.

The stock is fed from right to left through friction feed rolls to and through a stripper plate which shuttles back and forth on a horizontal plane with no vertical movement. Both punch and die

46

approach and recede from the stock, leaving it free to move from one station to

the next without interference.

No conventional flywheels are used, since the "Hypermatic", in effect, use a "flywheel die head", and, at each cut, the force required subtracts from the circular inertia of the heads, and no perceptible shock load is received by the crank. The wear on the crankshafts is claimed to be negligible.

claimed to be negligible.

The high velocity of the unit results in about 10% cut and 90% break, producing stampings with less burr, distortion and draft than would be ordinarily possible. It is common practice to register the stampings so close together that length of scrap between blanks is less than the thickness of the metal, resulting in considerable stock saving, on long

PHINE

Detailed information on the design, specifications, and performance may be secured upon request to:

Lempco Products, Inc., Dept. BB

Bedford. Ohio

STUART CENTERLUBE NOW AVAILABLE

The Stuart center point lubricant known as "Centerlube", possessing high-load carrying capacity to prevent the damaging of centers under heavy loads, has heretofore been packaged in large size containers. It has had successful application on lathes, milling and grinding machines, steady rests, and other fixtures sustaining heavy weight in a limited space. Centerlube is now being put up in an applicator tube size, for convenient use. In the usual jar or tin container, there has been found to occur a certain percentage of waste.

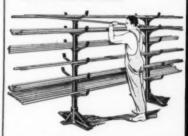


As the Centerlube is used, the tube is rolled up, completely eliminating the possibility of waste. Machinists also find the tube applicator useful, since its narrow nozzle permits the injection of the lubricant directly into vital parts of a machine with a minimum of waste. Write for folder to:

D.A. Stuart Oil Co., Dept. BB 2727 S. Troy St., Chicago 23, Ill.



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money far its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTION-AL RACK is a simple, durable article built in five styles from standard interlocking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal throughout, depreciation is practically nil. SEND FOR BULLETIN NO. 26-B.

BROWN SECTIONAL RACK

BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

MEMO

- PRODUCTION P
 - TOOL DESIGN
- ☐ PURCHASING
- MAINTENANCE

Carbide tools O.K.
but cooler operation
will cut costs. Try the
new Lusol coolant
we saw at Chicago
Show.
Get test sample
from Anderson Oil Co
Portland, Conn.
Portland, Conn.
G. M.



TRY LUSOL

ANDERSON OIL CO.
712 BROWNSTONE AVE.
PORTLAND, CONNECTICUT

MAKERS OF RUSTAVOID

DO-ALL "COOL GRINDING" METHOD MAINTAINS LOWER TEMPERATURES

"Cool Grinding", a development of the DoAll Co., introduces a new method of cooling work during grinding operations. The method is claimed to achieve the dual advantages of having the visibility of dry grinding coupled with finger-tip control over adequate cooling of the work being ground.

The introduction of coolant directly at the point of contact between wheel and work is the principle of "Cool Grinding." It eliminates the need for splash guards, settling tanks, pump motors, hoses, and floor space formerly occupied by coolant units.

The "Cool Grinding" unit consists of a coolant reservoir mounted on the spindle column, a sight drip valve, and a special



wheel adapter. The coolant is fed from the reservoir at a rate of from one to four drops per second, depending upon the material being ground. The coolant is directed into the front of the special wheel adapter, where it enters the arbor hole of the grinding wheel. Since the grinding wheels used contain no lead or ceramic, the coolant enters the wheel at the inside, and is thrown by centrifugal force to the outside grinding face of the wheel.

With DoAll "Cool Grinding", the coolant is applied at the actual point of grinding. DoAll tests claim that temperatures are held several hundred degrees below those found in the best conventional wet grinding systems. It is said that surface cracks can be virtually eliminated.

Since the coolant flows through the

wheel, it flushes and cleans the grinding surface, resulting in longer wheel life, and better finishes, especially in softer materials such as copper, bronze, and aluminum, according to the DoAll Co.

This unit is now available as an attachment for DoAll 6" x 18" surface grinders. It will soon be offered for other makes of surface grinders, as well as for bench, cylindrical, centerless, and internal grinders.

Complete details on the "Cool Grinding" method may be obtained upon request to:

The DoAll Co., Dept. BB DesPlaines, Ill.

NEW CARBIDE TOOL AND HOLDER

A carbide tool and holder has been developed and tested by the Econotool Co., in which the tool tip is held in position by a spring steel clamp, firmly supported. The manufacturer claims that these tools are well adapted to the older machines, where these is back lash, stalling under the pressure of cut, or intermittent cuts. Under these conditions, the tip will usually lift and bend back the spring clamp instead of breaking off.

Outstanding features of this new carbide tool include the spring steel clamp arrangement which allows "stalling" in the cut with the feed engaged without



shattering the carbide tip. The "2-in-1" hardened alloy steel holder has two clamping positions, allowing easy reconditioning. The positive adjustment feature is especially good for semi-automatics, etc. The tool is available in all manufacturer's standard grades of carbide and cast alloy.

A table of performance data with the Econotool spring type tool holder may be obtained from the manufacturer; write:

Econotool Co., Dept. BB Jenkintown, Pa.



Because There's

NO TIME LOST changing tools.

With a Colwell Turret, you set up ONCE, to do FOUR successive operations. Get the whole story of this proven production tool. Ruggedly built, positive indexing for close tolerance work, and economically priced. Sizes for most lathes.

As Low as \$36

Send now for catalog.

S. G. COLWELL 25 Congress Ave. Providence, R. I.

SELF-OILING RACHET PIPE THREADER

An improved design of a pipe threading tool, for which several advantages are claimed, has been announced by the Threadwell Tap and Die Co. A self-oiling feature is one time-saving convenience provided in the unit. A full day's supply of oil is carried in the handle, and the dies may be oiled while in use merely by pressing the plunger at the end of the handle.

The dies are located in direct line with the handle, which results in easier operation, without the possibility of twisting action, and with true starting, smoother cutting, and longer die life: threading of shorter, close-coupled nipples is possible. Torque tests have indicated that this threader requires one-third less cutting effort.

The Threadwell Self-Oiling Pipe Freader is equipped with heat-treated tool steel dies. designed with radial clearance for smooth operation. The die heads may be changed simply by pulling the knob on the ratchet pawl. The die segments are quickly replaceable. The



jet of oil applied while cutting threads is claimed to increase the life of the dies by as much as 150%. Die heads from \(\gamma^{\eta}\) through \(1\gamma^{\eta}\) are available, with right hand dies.

Further specifications from: Threadwell Tap and Die Co., Dept. BB, Greenfield, Mass.

QUICK STOP SPINDLE ACCELERATES CHANGE OF BUFFING WHEELS

A more rapid means of switching from one polishing or buffing wheel to another on any type of unit has been developed by the Louis C. Rathbun Co. By the use of the new Quick Stop Spindle, the operator grasps the large



with MAJESTIC DRILL SHARPENER

New you can always have perfectly sharpened, fast-cutting drills that really take the proper bite and ext smoothly without chatter. Simply turn the Automatic Dial Control, and Majestic Drill Sharpener is set to grind both cutting dedice and both amples exactly alike. Takes any size drill from 5/32° to 1°, straight or No. 2 tages shank. Fits any grinder. Adjustable to grind drills for cutting hard or set materials. The Majestic Drill Sharpener is a real production tool that the straight of the set of the factories, garages and remain shops. Price 38.50 F.O.B. Factory, ask your supply house, or order direct. Many thousands in use. Circular on request.

Dealers, Jobbers: Write fer information

MAJESTIC DRILL SHARPENER CO.

1335 So. 6th St.

Minneapolis 4, Minn.

PUNCHES and DIES



A large range of round, flat, square, and oval sizes is carried in New York stock.

Special Tools and Odd Sizes Made to Order

Circulars covering our line of metalworking tools available.

T. H. LEWTHWAITE MACHINE CO. 312 East 47th St., New York 17, N. Y. portion of the spindle with one hand, and the screw taper end of the spindle will stop, permitting instant change of wheels without requiring a motor shut down.



The new accessory fits any standard motor shaft, according to the manufacturer. It consists of an aluminum housing, with bronze bearings inside; all steel components are machined. Complete data will be sent upon request to:

Louis C. Rathbun Co. 18 So. Frederick Ave., Dept. BB Oelwin, Iowa

LIGHT WEIGHT, PLASTIC SAFETY SPECTAGLES

The new Watchemoket No. 30 Eye Savers have been designed to fit easily over all types of glasses, including the widest safety spectacles. The sturdy, light weight frame is molded to withstand heavy impact. An extra large bridge-size provides universal fit, comfortable for day-long wear. Shatterproof Impax plastic lenses exceed Federal specifications for impact-resisting goggles.



They protect glasses from scratches or breakage and eliminate the risk of broken glass penetrating the eye is case of accident. Frame or lenses are quickly replaceable. The exceptional light weigth of this goggle encourages workers' cooperation in plant eye-safety programs. For further information, write:

For further information, write: Watchemoket Optical Co., Providence 3, R. I., Dept. BB

PHILLIPS Rotomatic Vapor Degreasers

CONVEYORIZED PERFORMANCE!

- Controlled cleaning Cycle!
- Open top degreaser cost!
- Timed for proper cleaning!
- 75% reclamation of solvent!
- · Great economizer of labor!
- No installation costs!



ENGINEERED

PHILLSOLV ...



the perfect cleaning solvent for all metals or combinations of metals. PHILLSOLV will not affect or stain highly polished surfaces. Send for FREE Booklet "Questions and Answers on Vapor Degreesing".

PHILLIPS MANUFACTURING CO.



tihe RPM's stay up while grinding ... not 'nly when the grinder runs idle.

is an established fact that surface speeds flust stay up to approximately a mile a dinute if you want to grind - not just rub. he speed of Kipp air grinders drops but ightly when put to work. That means Letter work - longer wheel life.

uv Kibb air tools for best results. lower prices.



MADISON-KIPP CORP.

37 Waubesa St., Madison, Wis., U.S. A.



HYDRAULIC GRINDERS FOR PRODUCTION OR TOOL BOOM

Two new hydraulic grinders have recently been added to their line by the Grenby Manufacturing Co., consisting of the Model EG-103, Universal External Grinder (illustrated) and the Model IG-103, Universal Internal Grinder. Either type can be equipped with two heads to make a combination external-internal grinder.

Capacities are: External: 3" diameter x 10" long between centers; internal: 3" diameter x 4" long. Both types can grind work up to the full swing over the table of 9" diameter.



These units are primarily tool room equipment, but due to the accuracy of the stops for maintaining size, the lever collet closer, hydraulically operated table, semi-sizing diamond dresser, and other features, they can be used as production machines.

Included features are a live spindle work head that takes 5C-1" collets, a taper bayonet lock spindle nose for 3 and 4 jaw chucks, face plates, and a dead center attachment. The grinding wheel head swivels 15°. A ¾ HP motor drives the 10" x 1" external wheel or the 15000 rpm and 32,000 rpm internal spindles.

The table has infinite speed changes from 0" to 100" per minute, and oscillates a full 10" or as little as 1/32". It is operated entirely hydraulically even when manually controlled.

when manually controlled.

Complete specifications on these units are available upon request to:

The Grenby Mfg. Co., Dept. BB, Plainville, Conn.

STEEN HIGH SPEED PIPE AND TUBE CUTTER

The Steen High Speed Pipe and Tube Cutter is manufactured by the Continental Machine Co. The unit is made in three sizes, Nos. 3, 6, and 12 for cutting pipe or tubing from ½ to 3", ½ to 6", and 3 to 12" in diameter. An attachment can be obtained for the Nos. 3 or 6 size for cutting pipe from ½ to ½" in diameter.

The shaft of the cutter is made of chrome-nickel steel, heat treated for toughness, and provided with a large roller bearing to eliminate the friction which could reduce operating power. The gears are also of heat-treated chormenickel steel. The cutter block rolls are hardened tool steel, provided with roller bearings and tool steel pins which allow the pipe or tube to turn freely.

On the Nos. 3 and 6 tube and pipe cutters, the gage works automatically with the cutter arms, enabling maximum output to be obtained with wear and friction on the gage reduced to a minimum. As the cutter becomes engaged



with the pipe or tube, the gage is automatically released. Complete information available by writing to:

The Continental Machine Co. Dept. BB, 1952 Maud Ave., Chicago 14. III.

Anderson BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work . . . saves time . . . saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	68 in.	10,000





Write for Bulletin No. 1-5



ANDERSON BROS. MFG. CO., Rockford, III.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Staightening Presses.



LONG TAPER STAMPS



New Long Taper and Chamfered Corners for Locating Base of Letters and Aiding in Correct Spacing and Aligning • Steel Letters and Figures • Heavy Bevel • Heavy Stock • Tough Tool Steel • Deep Engraving •

> Write for Bulletin BB 15

PIK QUIK STAMP INDEX STAND

(Patent Pending)

Designed to speed up your Marking. Any character is quickly picked up and replaced in the Index Stand, keeping the stamps in perfect order. Our stamp prices up to ¼" include an Index Stand.



NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N. Y.

HANNIFIN SMALL SIZE ARBOR PRESSES

Two new air operated arbor presses, Models M-1 and M-2, are in production by the Hannifin Corp. Both feature a new push button controlled electric valve which eliminates manual valve operation, and speeds up the operating cycle. Model M-1 is equipped with a 4½" dia. x 4" stroke air cylinder and develops up to 1270 lbs. ram pressure with 80 lbs. air line pressure. On Model M-2, the cylinder measures 6½" dia. x 6", and is capable of delivering ram pressures up to 2650 lbs. In both presses, the stroke can be varied to meet work requirements.

Both presses are designed for bench mounting and are similar except that the M-2, illustrated, is built ti accomodate



larger work. In the M-2, the gap distance from table to ram is 12¼; in the M-1, the gap is 6". Either press is available without base for special mounting.

These new units are applicable to common press fit assembling operations, such as in the manufacture of electric motors, small tools, and bearing parts; they are also suitable for light stamping, marking, and die cutting operations. Further information will be sent upon request to:

The Happifin Corp., Dept. BB 1101 S. Kilbourn Ave.,

NEW MAXWELL RATIO RECESSING TOOL

The Maxwell Company has announced the extension of its standard line of recessing tools to include a new Ratio Recessing tool, designed for operation on



Model 6-S for 16" to 18" lathes 30 Models

6" to 36" swing.

Immediate Delivery

Write for catalog giving lathe swing and tool size used.

ENCO PRECISION TURRETS

Assure you accurate work because— Enco turrets employ precision spring loaded balls to accurately position each station. Multiple balls & seats insure repetitive indexing to within .0005".

CHECK THESE FEATURES

- * All hardened construction.
- * 12 position indexing.
- * 3 working positions for each tool.
- * Vise lock mounting.
- * Precise reindexing.
- * Ease of operation.
- * No chip interference.

ENCO MANUFACTURING COMPANY
Dept. 21 4522 Fullerton Ave., Chicago 39, III,



high speed automatic machines to accomplish grooving, backfacing or recessing with extreme accuracy. The cutter of the tool moves in a radial direction in a predetermined ratio ranging from three to eight times slower than the forward movement of the spindle so as to maintain the proper cutting feed per revolution. This feature adapts tools to high speed production machines where operations other than recessing can be performed rapidly.

The new ratio tools are available in four standard sizes for grooving, backfacing and recessing holes ranging from % to 4" in diameter. All tools utilize standard size straight shanks of 1, 1½ and 2" and all shanks are interchangeable to permit tools to be used on any available machine in production.

Multiple cuts can be made with the same speed as single cut. Accuracy is assured within .001-inch. In operation, as tool is moved forward to workpiece, incline plane and gear sector mechanism come into play and cutter gradually extends beyond the diameter of the pilot to cut the required groove or grooves smoothly and quickly. Amount of movement made by cutter can be adjusted

simply by means of adjusting-collar. Setup time is reduced to minimum. Recesses can be spaced from either the top or bottom surfaces.



Additional information can be supplied upon request to:

The Maxwell Company 220 Broadway, Dept. BB Bedford, Ohio



DETROIT POWER SCREWDRIVER CO.

2809 West Fort Street, Jetroit 16, • Michigan

ALMOND **DRILL CHUCKS**



Maximum gripping power with extreme accuracy and long life.

Write for Catalog

T. R. ALMOND MFG. CO. ASHBURNHAM, MASS. U. S. A.



Patented

World's Best; Surface, Lapping, Angle Plates, Straight Edges, Box and Steel Parallels, semi-steel plates and special products. Until further notice write

TATRA TOOL CO.

Box B-62

C/O HITCHCOCK PUBLISHING COMPANY 542 S. Dearborn St. Chicago 5, III.

DUAL CHARMO FURNACE

1. GENERAL HEAT TREATING 2. GAS CARBURIZING

This furnace produces its own prepared gas atmosphere for general heat treating. For gas carburizing this atmosphere is enriched and recirculated by a special mechanism. During gas carburizing treatment only a portion of the gas is passed through the recirculating system, thereby preventing the cooling of the entire gas flow. Only about 10% is removed from the muffle at any one time. Twin filter units are incorporated to avoid shut-down for filter cleaning.

This is an ideal furnace for the plant requiring both clean 2634F 3 hardening and gas carburizing operations.





Standard Rated FURNACES

OMBUSTION CORPORATION, TOLEDO 1, OHIO

NEW LANDIS HYDRAULIC GRINDERS WILL TAKE WORK UP TO 10,000 POUNDS

The Landis Tool Co. has announced a new type plain cylindrical hydraulic grinding machine first shown at the recent Machine Tool Show in Chicago.

The new machine is made in three different types. The Type F Plain swings 14" and 16" work weighing up to 6.500 pounds. Length between centers ranges from 36" through 48", 72", 96" (illustrated), 120", 144", to 168", For grind-

lustrated), 120°, 144″, to 168″. For grinding heavier work, the Type FF Plain will carry work weighing up to 10,000 pounds between centers, and in swings of 16°, 20° or 24°. This model is available in nine sizes, with center distances ranging from 48″ to 240″ in 24″ increments. For grinding rolls weighing up to 10,000 pounds, the Type FR machine is made in 16″, 20″ and 24″ swings and includes built-in crowning and concaving



mechanism. Center distances range from 48" to 168" in the usual increments. All three types use a 30"x3"x12" wheel as standard equipment.

Among the new features are Microsphere wheel spindle bearings which are pressure lubricated and immersed in lubricating oil. A safety pressure switch prevents rotation of the spindle until a pre-determined pressure is built up in the filtered oil lubricating system. Fail-



ure of the system will automatically

stop spindle rotation.

The lubricant used for the carriage guides is pumped from a separate reservoir in the bed. This system is also provided with a safety pressure switch and filter. If this system should fail due to broken lines or lack of oil, all motors on the machine will stop. Telescoping guide covers protect the carriage guides from foreign matter regardless of the position of the carriage.

The headstock is constructed for complete vee belt drive from motor to jackshaft and jackshaft to face plate. All bearings are of the anti-friction type. A spindle indicating tachometer flush mounted on the headstock is available.

Taper adjustment of the swivel table is at the heavy headstock end. A built-in dial indicator provides means for accurate taper adjustments. A pre-loaded bearing is used on the swivel stud to elim-

inate all possible shake.

A variety of grinding wheel feeds may be had to suit the grinding set-up. They may be either electric or hydraulic or combinations of the two. Straight infeed for plunge grinding or feeds at each carriage reversal may be had on these machines.

The complete electrical installation meets all the latest electrical standards set up by the NMTBA and the automotive industries.

Complete and detailed specifications on these new models are available upon request to:

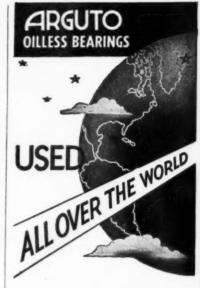
The Landis Tool Company Dept. BB, Waynesboro, Pa.

SMALL PORTABLE HYDRAULIC POWER

A compact, portable hydraulic power unit capable of supplying three gallons per minute at 1000 psi. is announced by Hydro-Power, Inc. Designated as the "Paul Bunyan, Jr.", the new unit can be quickly applied to the operation of shaft extractors, arbor presses, broaching tools, lifting jacks, vises and similar shop equipment.

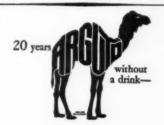
The unit includes a 17-gallon storage tank with foot mountings, an electric motor. V-belt connected gear pump, and 4-way operating valve. Weighing approximately 290 pounds when supplied with operating oil, the assembly occupies a space 16½ wide by 28″ long by 29″ high. The unit can be mounted on casters, or placed on a hand truck.

Normally supplied with a 11/2 h.p., 1800



... IN MANY DIFFERENT APPLICATIONS

"OUTWEARS THE BEST BRONZE METAL"





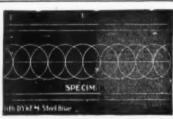
OUR EFFICIENT TOOL DESIGNING

means better production at a lower cost

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

COLUMBUS DIE . TOOL

930 CLEVELAND AVE., COLUMBUS O OHIO,



DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed agout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301G North 11th St., St. Louis, Me. in Canada: 2406 Dundas St. West, Toronto, Ont.

rpm., 220 or 440-volt motor, the unit can be used with a 2½ h.p., 1200 rpm. aircooled gasoline engine for outdoor use.



The gear pump is mounted integrally with operating valve, which has a ball-handle lever operating at forward, neutral or reverse positions. Check and relief valves are built in the main valve body. Complete technical data will be supplied upon request to:

Hydro-Power, Inc., Dept BB, Springfield, Ohio

NEW, HEAVY-WALL, THERMOCOUPLE PROTECTING TUBE

The Claud S. Gordon Co. has developed a new process for making a heavy-wall, cast-iron, thermocouple protecting tube. The manufacturer reports that this tube has a longer life and is more practical than the ordinary castiron tube used for molten aluminum, zinc and die-casting metals.

Gordon "Serv-rite" heavy-wall, castiron tubes are cast with both ends open, and a special technique is employed for weld-closing one end. Porosity is eliminated by the addition of a small amount of alloy element. It is said that X-ray inspection reveals three conditions that are economy factors—uniform wall thickness, freedom from casting defects and good welding. This new Gordon "Serv-rite" tube is furnished with a \%" wall thickness and a 5/16" inside diameter. For information, write:

The Claud S. Gordon Co., Dept. BB 3000 S. Wallace Ave.

Chicago, Ill.



The extremely precise operation that you expect is easily of tainable on the Nichols Toolroom Model. Mand wheels, with large adjustable micrometer dials, provide for extremely fine longitudinal and transverse feeds. An extra large hand-scraped table (8" x 30"), with three T-slots, insures rigid set-up of long, light pieces requiring cuts up to 19" in length. These, plus the basic features included in all Nichols Millers—hardened and ground spindle mounted in preloaded bearings, heavy box-sectional knee with long, hand-scraped dovetail slides, accurate feed screws — combine to provide productive capacity that will meet the closest tolerances demanded in your toolroom or laboratory.



Far more complete details on this versatile mechine that "uses its head" to produce unusual forms accurately and with fine finish, send for the Nichols Miller Catalog.

THE Nichols MILLER

MANUFACTURED BY W. H. NICHOLS COMPANY, WALTHAM 54, MASS.
NATIONAL DISTRIBUTORS: NICHOLS-MORRIS CORP., 42-A CHURCH ST., NEW YORK 7, N. Y

TOUGH OVERLAYS and PATCHES

for

Nood or Concrete Floors



esurface or patch broken concrete floors with night RUGGEDWEAR resurfacer. Here's a taterial which will stand up under the most unishing traffic conditions. Simple to install no chopping or chipping required. Merely weep out the spot to be repaired—mix the taterial—trowel it on. Holds solid and tight ight up to irregular edge of old concrete, rovides a firmer, tougher, smoother, more ugged wearing surface. Used indoors or out.



Mail Coupon for

> FREE TRIAL OFFER



FLEXROCK Co.,

3634 Filbert St., Philadelphia 4, Pa. Conadian Off.: 21 King St., E., Toronto, Ont.

Please send me complete RUGGEDWEAR information . . . details of TRIAL ORDER PLAN-no obligation.

Name	
MOTHE	
Compa	

...

COLLET CHUCK FIXTURE HAS 56"

An angle type collet chuck fixture of rugged, normalized semi-steel, with the working surfaces hardened and ground, is in production by the Merrion Tool Engineering Co. The unit holds round, square, and hexagon work pieces in a collet actuated by a ball-handle manual lever. The accessory is claimed to be useful in drill, thread, cut off, ream, and similar bench operations.



The Merrion fixture measures $5\frac{1}{2}$ " x 6"; the collet has a capacity of $\frac{5}{2}$ " diameter. The collet is equipped with a cover to prevent metal chips from entering, for work sizes from $\frac{1}{2}$ " to $\frac{5}{2}$ ". An adjustable, removable stop is provided to allow long pieces to pass through the stop collar. For information, please write:

Merrion Tool Engineering Co., Dept. BB Berwyn, Ill.

CAM VISE FOR MILLING AND DRILLING SMALL PARTS

A small production cam vise has been recently introduced by the Morton Machine Works. The jaw, cam, and base of the unit are heat treated and ground, and finished in midnight black. The base measures 1"x2"x6"; the jaw, ¾"x1\%"x 2". This quick-acting tool is designed for milling or drilling small parts, and can be used either right or left handed. A vee slot is ground on one side of the jaw, enabling slots in round work pieces to be ground with ease.

A jaw with a horizontal vee is available for drilling cross holes in clevis

pins, etc. A bushing plate with keys to match either jaw may be obtained. Cata-



log bulletin on this item is obtainable

Morton Machine Works Dept. BB, 2421 Wolcott St., Ferndale 20, Mich.

TOOL AND WORK STAND

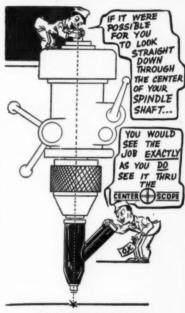
Made with heavy gauge steel shelves and heavy angle iron legs, these tool and work stands serve as parts and tool containers and transporters, tool and work stands in conjunction with operating equipment, assembly line parts containers, carrying portable inspection equipment on assembly lines or stock pickup and transportation.



The stands are finished in olive green baked enamel. They are shipped knocked down one in a carton with nuts and bolts for quick assembly, and are available with or without casters. Choce of 2 or 3 reversible shelves. Size: 30" without casters. 18" wide. 30" long. Additional information from:

Bay, Inc., Dept. BB 3003 N. 16th St. Philadelphia 32, Pa.

ONLY WITH THE Center Scope can you get . . . UNQUESTIONED ACCURACY



ONLY WITH CENTER SCOPE
Can you get unquestioned accuracy in locating lay-out
enters on your milling machines, Jig borers, lathes,
drill presses and other special machine tools.

CENTER SCOPES ARE ACCURATE
Plus or minus one ten theusandth.
CENTER SCOPES ARE FAST
Line-up your layout in 30 seconds.
CENTER SCOPES ARE SIMPLE
ANYONE can use them.
INSIST ON THE GENUINE CENTER SCOPE
Write for Catalogue No. 8

CENTER SCOPE PRODUCTS

3829 San Fernando Road Glendale 4, California

B. & S. NO. 5 CUTTER AND TOOL GRINDING MACHINE

This new addition to the Brown & Sharpe line of machine tools has been de eloped specifically to handle tool-room sharpening jobs of the smaller class, especially end mills. The super-sensitive operation of this

machine is readily responsive to a light touch from the operator, making operation not only fast and easy but facilitating quick and accurate set-ups, ac-

cording to the designers,

Prominent in making this ease of operation possible is the table which slides on 36 precision-ground rolls. Lighter weight parts also contribute in providing a machine engineered for fast and accurate sharpening in addition to such features as a desirable work center height and conveniently located controls four-location table crank or knob), whether the operator is standing or sitting, depending upon the job at hand. A double-ended ball bearing wheel spindle is used with the bearings of the

precision, permanently-sealed, greaselubricated type. Floor space is unusually small for a machine of its capacity and the hollow, one-piece base is mounted on three points to preserve alignment.

The centers swing 6%" in diameter. Greatest distance from center line of work to center of wheel spindle is 81/8"

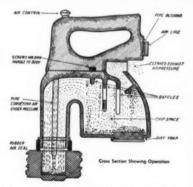


.. the shortest distance, 15/4". Greatest distance from center of wheel spindle to top of table is 6%" and the least distance 1%". The spindle slide upright has

IT'S HERE!! THE **BUFFALO PNEUMATIC** CHIP GUN

A NEW METHOD OF REMOVING CHIPS FROM BLIND DRILLED AND TAPPED HOLES.

Eliminate the danger to your workmen from flying chips by removing your cuttings with the BUFFALO PNEUMA-TIC CHIP GUN. Simply place the nozzle over the hole, release the air by thumb pressure and the cuttings are deposited in the body of the gun.



SAFE!

CLEAN!

EFFICIENT!

Write for Bulletin No. 1011 today

BUFFALO MACHINERY CO., INC. Buffalo 13, New York

838 Grant Street

41/4" transverse movement and 3" longitudinal adjustment with transverse adjustment hand wheel graduated to read to 001". Wheel spindle slide has vertical adjustment of 5½" with elevating hand wheel graduated to read to 001". Additional equipment is available for work requiring indexing and formed cutter sharpening. For complete details, write: Brown & Sharpe Manufacturing Co.,

Dept. BB. Providence 1. R. I.

HIGH SPEED ROTATING AIR CYLINDER

The new Skinner aluminum high speed rotating Air Cylinders have been operated with satisfactory results at speeds up to 3500 rpm over long periods of time; they are recommended for installation on machines operating at speeds up



to 3000 rpm. These cylinders, in sizes 41/2" to 12" in diameter, are made from aluminum alloy forgings, thus eliminating the porosity which exists in aluminum castings. Complete information and bulletins on these units may be secured upon request to:

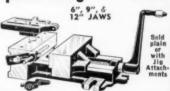
The Skinner Chuck Co., Dept. BB New Britain, Conn.

REDHARD PRECISION KIT

Redhard Metals Inc., has recently announced a useful plexi-glass case containing twelve tool bits, ranging from 3/16" square to 3/" square inclusive, in three grades of cutting metal—Redhard P.S. (Precision High Speed), Redhard P. N. (Precision Non-Ferrous), and Redhard P. C. (Precision Carbide). The P.N. and the P.C. are tipped tools. Included in the case is a special honing stick. For details, write:

Redhard Metals Inc., Dept. BB North York Road Hatboro, Penna.

BASIC UNIT for repeat-operation positioning of work



GRAHAM Multi-Purpose Vise

Finished with surfaces flush, parallel and square, this vise forms a Basic Unit for precision holding, and is designed to add

STOPS, GUIDES, SHELL JAWS, V-JAWS, BUSHING PLATES, ETC.

Ready-made jig or fixture saves many toolmaking hours.

Use this vise to form the central basic holding unit for production operations on drill press, radial, planer, miller, shaper, grinder. Accurately finished. Heavily constructed to maintain uniform position of work under heavy cuts. Sizes up to 124 lbs. We furnish numerous attachments—easy to add others for holding wide variety of irregular shapes.

"Adjust-angle" Knurl Holder



work up to 21/2" Send for **Illustrated Price Bulletin 41**

diameter.

cut many different patterns on

GRAHAM MFG. CO.

56 Bridge Street, East Greenwich, R. I.

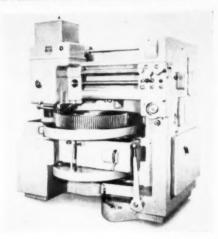
FELLOWS 36-INCH GEAR SHAPER PERMITS HEAVY CUTS AT HIGH SPEED

A new Gear Shaper has been placed on the market by The Fellows Gear Shaper Co. This machine, which has been designed for general-purpose gear cutting, is of massive construction, and is adapted to the cutting of external and internal spur and helical gears.

The large one-piece cutter-spindle is designed to carry a 5-inch cutter and is operated by a heavy and rigid reciprocating mechanism. The saddle carrying the cutter-spindle and guides is also of heavy design with "square-lock" gibs, and is rigidly supported on the bed. Twelve different reciprocating

Twelve different reciprocating speeds ranging from 18 to 300 strokes per minute are obtainable through a selecting dial located within convenient reach. Four rotary feeds are available through a 4-speed transmission controlled by a feed shift lever. Additional feeds are obtainable by changing two "pick-off" gears. The arrangement for controlling the depth feed employs limit switches and adjustable dogs. These dogs

switches and adjustable dogs. These dogs are held on a drum mounted on the feed-



cam shaft which is rotated intermittently by a cam and latched ratchet driven by

CUT ANY SHAPE BETTER with BEVERLY Throatless SHEARS



The No. B-3 BEVERLY Bench Type Shear with Ball Bearing Hold Down handles 3/16" or No. 10 gauge stainless steel. This sturdy shear weighs 58 lbs. and is equipped with H. C. H. Blades for heavy duty service

Let us send Bulletins giving full details on the BEVERLY LINE —

THE BEVERLY SHEAR MFG. CO., 3005 W. 110th Pl., Chicago 43, Hl.

CUT A FEW KEYWA!

IN GEARS, CUTTERS, COUPLINGS, COLLARS, PULLEY HUBS, etc.

AND YOU'VE PAID

FOR THIS KIT!

MINUTE MAN Keyway Broach Kit cuts any size keyway, by hand

IN ONE MINUTE!



Here's a set of fine tools that you'll be proud to own — that's worth its weight in gold every time you have a key to cut.

The **MINUTE MAN** Kit and a du Mont Arbor Press ; you everything you need to cut a clean, accurate keywa sixty seconds.

ACT NOW! You're losing time and money every minute you spend cutting keyways by obsolete, expensive machine methods. You need the *Minute Man*.

YOUR NAME and address on a penny postcard will bring you the name of the nearest Minute Man Mill Supply Distributor and copy of new Descriptive Folder and Price List "T".

The du MON
CORPORATIO
GREENFIELD, MASSACHUSE

ABORATORY PURE DIAMOND STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

Precision LAPPING POWDERS for PRECISION work

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN STAR DUST indispen CARBIDE, CHROME.

· Absolute control of particle sizes Absolute control of particle sizes

STAR DUST sizes as fine as .0001**

Complete absence of out-size particles

Complete range of arit sizes

There is a STAR DUST Field Serviceman in your territory,



ONE SPRUCE NEW YORK 7.

he crankshaft. The cutter can be fed nto depth by independently adjustable teps, as determined by the number and osition of the dogs. Rotation of the work is determined at any depth of cut y a counter, which is mechanically the lower index-wheel riven from vormshaft, and which operates electrical ontacts at each complete revolution of he work

The machine operates as follows: When he "power-on" selector switch is turned on, the lubrication pump starts, and lower is brought to the "start" button or the main motor. Pressing the "start' outton starts cutter reciprocation and otation of cutter and work. The cutter s fed into the work until the first dog perates the limit switch, at which point he in-feed is stopped, by a solenoid which locks out the ratchet feed mechnism. At this point, the counter clutch oil is deenergized to start rotation count of the work. Upon completion of one roation of the work, the counter contact perates to cause the depth-feed solenid to unlock, and rotary feed progress s before until the next dog engages the

limit switch. This cycle is repeated for each dog, until the final cut is taken, and the machine stops automatically.

On the final cut, control is picked up by the second limit switch, and a fixed dog on the depth-feed cam drum. This second limit switch initiates the same function as before, and in addition, transfers the main drive holding circuit from "biased" relay (permanent magnet latching type) to a standard relay.

After the cut is completed, the operation of the counter causes the holding relay to be de-energized; this in turn de-energizes the main drive, and stops the machine. Complete technical data on the 36" Gear Shaper is available upon request to:

The Fellows Gear Shaper Co., Dept BB Springfield, Vermont.

In the 1947 Directory of the Machine and Tool Blue Book, the Meinhardt Dia-mond Tool Co., 2800 N. Milwaukee Ave., Chicago, Ill. was omitted from the category "Diamonds & Diamond Tools", due to an oversight in the compilation of the

FLAT STOCK

velvet finish THE WORLD'S LARGEST RANGE OF STOCK SIZES (all sizes in stock ready for shipment) Individually wrapped & shipped in wood Box

Production Surface Grinding on Hugh Grinders Write for New Catalog & Prices BOX 58-B SPECIAL SIZES HEAT-TREATED or SOFT, GROUND TO YOUR SPECIFICATIONS

I'S L E.



* THE * WONDER CUTTER

The lowestpriced wire and rod cutter on the market. The hardened cutters last indefinitely.

estorder on
The
cutded. A giant for work, cut-

Hand operated. A giant for work, cuts wire and rods up to \(\frac{1}{2} \)-in. round of \(\frac{1}{2} \)-in. square and band iron up to \(\frac{1}{2} \) in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small your shop can use a WONDER CUTTER.

Write today for prices.

THE FEDERAL FOUNDRY SUPPLY CO.

4602 East 71st St., Cleveland, Ohio



1810 S. KILBOURN AVE. CHICAGO 23, ILL



Saves time, saves labor, saves trouble, keeps costs down.

This amooth-running ball-bearing thrust reel is so quick and easy on the draw it actually seems to have brains; so fast it seems to naticipate the needs; yet it retains such complete control of stock through its special features that stock never "gets away" or out of conrol.

Write us for details today.

The RULETA Co.



CONN.

SCHERR aids to precision — production

THE COMPARITOL

Where inspection accuracy to "Tenths" and better is absolutely essential in such parts as gages, threads, fine wires, cylindrical ground work, etc., the Scherr Comparitol will give indisputable results. It can be used by anyone with a few minutes' instruction, can be placed near machines for constant spot inspection, as well as used for final inspection. Long-lived patented knife-edge mechanism needs no oiling, has no gears, racks, multiple levers, pivots or bearings, no electrical connections, bulbs or transformers. Thousands in profitable use everywhere.



Optical Flats

Essential for checking wear and flatness of lapped surfaces. Reveal deviation in millionths from absolute flatness or parallelism of micrometer anvil. gage blocks, refrigerator, airplane parts, etc. Sizes er quartz

ATLANTIC ADJUSTABLE LIMIT SNAP GAGES



Made in strict accordance with American Gage Design Committee specifications. Frames of Meehanite. Wide range of sizes, from .195 to 115a". With round of square gaging pins, solid anvil, ex-tended anvil, etc. The last word in snap gages, and at most interesting prices. Write us for details-and also about the Scherr special service for trueing and setting worn ednes

Write for full details on the above tools. and for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc. 198 - Lafayette St. New York 12, N.Y.

CORROSION RESISTING INCONEL FLEXIBLE TUBING

A new flexible tubing made with Inconel innercore and braid is announced by Titeflex, Inc. The hose may be supplied for temperatures up to 1700°. The innercore is supplied with wall thick-nesses of 0.005 to 0.015 inches. The thicker wall tubing is recommended for the larger sizes where high pressure is the primary requisite, and the thinner wall where the pressure is not over a few hundred pounds p.s.i. and weight is the critical factor. Construction of the Tite-flex tubing resists failure caused by excessive vibration.

Titeflex Inconel flexible tubing is recommended for extreme service con-ditions where Monel metal or brass would be affected. Recommended applications include flexible exhaust tubing for automotive power plants, and for chemical equipment where the corrosion resisting properties of Inconel are required. For complete details write:

Titeflex, Inc., Dept. BB 500 Frelinghuysen Ave., Newark 5, N. J.

UNIQUE LOCKING TERMINAL BLOCK

Featuring a terminal "lock-in" arrange-ment which eliminates the danger of ment which eliminates the danger of spade lugs pulling out, a new terminal block has been developed by Curtis Development & Mfg. Co. The block is provided with solder-type spade lugs recessed into the body of the device. When the binder screws are tightened, each lug is held rigidly in place against a shoulder of tough phenolic forming the terminal block.

Terminals cannot pull out or drop out, it was said, but any terminal can be quickly removed or replaced simply by loosening the binder screw and lifting the lug out of its lock-in position. The screws are insulated to ground, as the base of the phenolic block is absolutely

It is designed to fit installations where space is limited. The block is factory assembled in any desired number of terminals from one to 18. According to terminals from one to 16. According to specifications, a 10-terminal block, for example, is 5%" long, with overall height of "\$", width, including lugs is 13/16". Complete information on this Type "K" Terminal Block may be had by obtaining Bulletin DS-114 from:

Curtis Development & Mfg. Co., Dept. BB, 1 N. Crawford Ave. Chicago 24, Ill.



BENCH MODEL NO. 12

A new low-priced bench model hand tap ping machine of proven advantages. Will save you time, taps and rejects on your tooling time and small lot production. tooling time and small for the tooling time and small for the tooling time and small for the tooling time and the At your mill supply houses, or

THE LASSY TOOL CO., Plainville, Conn.

PEERLESS BELT SURFACER



This BELT SURFACER is accurately balanced and sterdily built for hard constant use. It i smooth running and adjustments are quick and con venient. Abrasive belt is 6x42" handling a wid range of work speedily and accurately. Let us sen bulletin giving full details, covering our complete line of bench and floor type surfacers, 6" to 20" cizec

Let us send bulletin giving full details.

PRODUCTION MACHINE GREENFIELD, MASS.

FROM OLD WITH NEW METHOD

Send us your old drills-we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size - and GUARANTEED ORIGINAL STRENGTH. No welding-No distortion -No shortening of drills-No sleeves.

Any drill, reamer, or other tool with Morse taper in sizes 2 to 6 can be re paired perfectly this quick new way Delivery—One week. Used by man leading industrial plants. Amazingly lo cost-satisfaction guaranteed! Send for complete information. *Patent Pending.

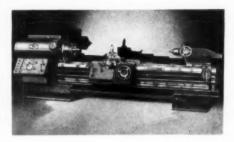
1337 Bates Street Cincinnati 25, Ohio

25" HEAVY DUTY ENGINE LATHE

The Boye & Emmes Machine Fool Co., lathe manufacturers or half a century, have just developed their new Golden Aniversary model, a 25" Heavy Duty Engine Lathe, designated is Model BF.

The capacity of this new unit ncludes a 27½" swing over the bed and carriage wings, and an 8³4" swing over the carriage pridge and taper attachment. The center distance of the base ength, tailstock flush is 48". The distance from the center pindle to the floor is 48". The loor space base length of the athe is 5°11"x11" 6".

The accessibility of all operating conrols of the Model BF is a salient feaure, as the cut indicates. The tailstock as been redesigned, and represents a narked departure from the conventional pull type. Maximum bearing area is retained regardless of the position of the ailstock slide. The tailstock screw is nounted under tension, and the nut is self-adjusting for wear, a feature claimed

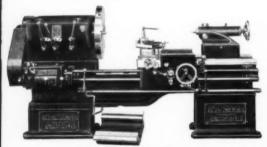


to be in contrast to the lack of such adjustment in the conventional type. A through hole of the same diameter as the hole in the headstock spindle is provided. The slide adjusting handwheel is at the front, and travels with the center, thus the relative position of the adjusting wheel and the center does not change.

The gear box is completely enclosed, and oil tight; lubrication is of the mist

NEBEL Removable Block Gap Lathes

Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for general manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, with motor mounted on rear of lathe. Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows: Series "LN" 18/27", Series "AA" 20/30". Series "B" 22/33, and Series "D" 25/40".

Write for Circular Giving Complete Information

THE NEBEL MACHINE TOOL COMPANY



FIECTRIC FTCHER

SPECIFICATIONS—Navy bronze contact plate; Aluminum alloy case 4" x 8" x 10"; Weight 22 pounds; Recessed, heavy duty heat selector switch and pilot light; Handy event storage compartment; Special current regulating transformer gives smooth ething action with the offset, congirjs stylus. For operation on regular 110-volt AC lighting elevatives, Illy guaranteed. Price 367-30. Immediate delivery.

R. B. ANNIS COMPANY

204 E. 11th St. Indianapolis 2, Ind.

KEYWAYS

-SMALL QUANTITIES

GLENNY on an ARBOR PRESS

Adjustable Expansion PUSH

PUSH BROACH PAT.

> Complete Assembly of Sturdy Broach and Holder No Additional Parts to

Assemble or Lose

Does Not Mar Bore

Factories, Shops, Tool Rooms, etc., everywhere frequently save the cost of a Glenny in one day's use.

SEND FOR BULLETIN

Dealers Also Write

The EAST SHORE MACHINE PRODUCTS CO.

835 EAST 140th ST., CLEVELAND 10, OHIO

New Britain UNIVERSAL VISE

THE ORIGINAL

Swivels 360 degrees horizontally, 100 degrees vertically, to give any angle or compound of angles.



NEW BRITAIN TOOL & MFG. CO. NEW BRITAIN, CONN., U. S. A.



Turner plastic hammers come in 15 different sizes and types — all statically balanced. Ask your mill supply house or write.

MATTICKS MANUFACTURING CO.

4156 E. PACIFIC WAY LOS ANGELES 23, CAL.

ype. All gears are above the level of il in the reservoir. All shafts are nounted in anti-friction bearings, and all gears are heat treated and shaved. wide variety of threads per inch is provided, ranging from ½ to 112; as nany as 64 feeds are permissible. The athe is powered by a 20 or 30 HP motor of 1800 rpm. A variety of accessories are lso available for this model, as extra quipment.

Complete specifications on this new mit may be secured upon application or Bulletin BF 100, from:

The Boye & Emmes Machine Tool Co., Dept. BB, 125 Caldwell Drive, Hartwell Cincinnati 15. Ohio.

THOMSON PUMPS STRESS MINIMUM MAINTENANCE

The recently developed Thomson pumps re constructed with large internal pump hambers which facilitate cleaning and naintenance. It may be seen from the ccompanying illustration why these units o not jam. A further advantage is the asy removal of packing seals for cleanng or replacement. The spring loaded eals prevent leakage under pressure or acuum. Thomson pumps are quiet in

operation, according to their manufacturer, and deliver a constant volume of liquid under pressure. The pumps have dual ports to provide a left or right hand assembly. By the nature of their con-struction, maintenance is kept at a minimum.



Further information on the specifications of these pumps is available upon request to:

Thomson Pump Div., Dept. BB Waterous Company St. Paul 1. Minn.



Next time try R & N Taps.

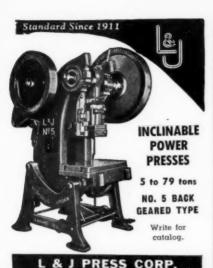
Many of the country's largest and most exacting Tap users rely on R & N to maintain peak production.

Dependable performance is not a difficult assignment when R & N HSS Ground from the solid Taps are on the job.

Our new 109 page. No. 8 Catalog is ready for mail-ing. A request on your let-terhead brings it.

COMPANY NESTOR

manufacturers of TAPS AND REAMERS LYKENS, PA.





successors in Lashbouch-Jordan Tool & Machine Co.

ELKHART INDIANA

1625 STERLING AVE

... quickly and accurately measures distance of projections from plane surfaces, depth of holes, etc. End slot of head makes it possible to get otherwise difficult measurements.

Solid head is %''x%''x3%'' hardened, ground and lapped. Scales are 3/32'' $x^{1}\!\!/_{4}''$ with end hardened.

Write for Folder

William A. Koenig 132 Ferry St. Troy, N. Y.

ROLL FORMING MACHINES AND ROLLER DIES



Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

Maplewood Machinery Co. 2634 Fullerton Ave. Chicago, Illinois



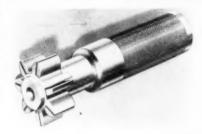
ADJUSTABLE TOOTH FORM USEFUL AS GEAR AND SPLINE GAGE

An adjustable tooth form providing a variable tooth thickness but still retainng a full profile bearing has been developed by the MP Tool & Engineering
Co. The tooth has individual left and ightside profiles extending through the ull width of the gear. These profiles are olled into or away from each other to vary the tooth thickness or tooth space. MP engineers claim that the adjustable ooth form will revolutionize gaging, hecking and chucking methods for gears and splines. The adjustable tooth form, which is also self-centering, solves such problems as concentricity, wear and enineering specification changes. In checkng operations, the MP Adjustable Tooth form is reported to increase accuracy and ave time in spline-locating problems nvolving diameter and face relations o internal splines.

The part is checked from the internal eeth only, regardless of the tooth space proached or the wear in the locator. This is made possible because of the use of a orsion spring holding the tooth profiles autward to a tooth thickness larger than into tooth space that is broached.

As a gaging device applied to internal

and external spline and gear gages, the company claims that the MP tooth form



in conjunction with dial indicators offers the only available means for visually indicating external and internal teeth. Double-checking operations utilizing "go" and "no go" gages are eliminated because the MP gage is in essence a comparator.

When the MP gear ring gage is adapted to a hole grinder or diamond boring machine, a self-centering adjustable gear chuck results. The locking rotary motion is imparted through a draw bar, helical slot and cam follower — either mechanically, hydraulically or pneumati-



6" x 18" 12" x 36" 12" x 60" 6" x 36" 12" x 48" 12" x 72"



A precision tool for testing and checking parts between centers. Both heads adjustable, locked in place by lever-operated clamps. Work is held between one fixed center while spring loaded retractable center clamps work in position. Dial indicator with adjustable holder available as extra equipment.

FREE ADDITIONAL DATA covering complete specifications and additional features is contained in this bulletin. Write for your copy today. Ask for data sheet No. 468.

SUNDSTRAND

2535 Eleventh St. . Rockford, Illinois, U.S.A.

cally. Once the gears are ground or lapped in place, the self-centering adjustable teeth which act as locators and grippers will remain correctly set indefinitely, but still will allow considerable latitude in varying tooth thicknesses without rendering the chuck obsolete.

Complete information on the MP Adjustable Tooth Form may be secured

upon request to:
MP Tool & Engineering Co., Dept. BB, Detroit. Mich.

HEIM SELF-ALIGNING FLANGED BALL BEARING

A double row ball bearing with an extended inner race for locking on the shaft, and grooved outer races, has recently been developed by the Heim Co. This product is so constructed that it compensates for misalignment and deflection of shafts; it can be used to overcome errors in machining or mounting of parts. The Heim self-aligning ball bearing is a completely self-contained unit which can be mounted easily, retains its lubrication, and excludes dirt and foreign matter. The inner and outer races are not ground, but have been carefully machined and finished to close tolerances,

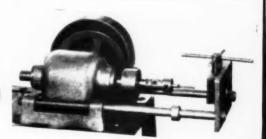
and are heat-treated. The unit will take axial thrusts in either direction and is designed for relatively light loads and medium speeds.



Stock items will also include a self-aligning ball bearing pillow block, a flanged pillow block, and a pillow block with a cast iron body. Write to: The Heim Co., Dept. BB,

Fairfield, Conn.

PEDBRO 2 in 1 Threading & Tapping Machine



 This new PEDBRO machine is designed for both tapping and threading. For tapping, insert Jacobs tapping chuck with No. 2 Morse tapper in spindle. To

with No. 2 Morse tapper in spindle. To thread, remove tapping chuck and insert regular round adjustable dies in collet at end of spindle. Spindle is hollow to permit threading of long rods. Spindle remains neutral when not in operation, thus eliminating unnecessary wear. V-jaw

vise is made to attach to end of slide to grip rods while threading, if necessary. Machine is equipped with tapping chuck and operates with 1/3 H.P. motor.

Capacity in steel—½ S.A.E.

· Price \$89.50 each net, F.O.B. Chicago.

· Motor and V-jaw Vise can be furnished extra.

· Can be used on bench or stand.

PEDERSEN BROS. TOOL & SUPPLY CO. 621 Washington Boulevard Chicago 6, Illinois

NEW TINKER THREAD GRINDER FITS ANY SURFACE GRINDER

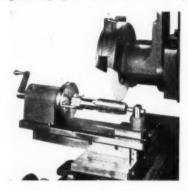
A new type thread grinder is anounced by the Tinker's Thread Grinder
Co. It has the ability of grinding threads
of any shape on any standard make of
urface grinder. The unit is 6" high,
-9/16" wide and weighs approximately
of lbs. It can be steadily held on the
agnetic chuck of any surface grinder.
A 4-inch sine bar on the end of the
ase is used for setting the helix angle
of a thread. The tailstock center is adustable to compensate for any error in
bork or if taper on work is required.

ustable to compensate for any error in vork or if taper on work is required.

A hand crank on the opposite end of hachine is attached to a master lead crew which in turn is directly conected to the live, ball-bearing center, ace plate. The lead screw runs thru bronze nut screwed onto the upright nd of the stationary base. The work rotated by the face plate driving a og attached to the work. As the lead crew is revolved, by turning the hand rank, the form dressed on the wheel is round in the work and at the desired itch.

With a specially made lead screw and ut, depending entirely on the relief ngle and diameter, circular form cutters requiring radial relief can be ground.

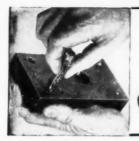
The movable slide which holds the work between centers runs on ball-bearing vee ways. This section can be locked against upright end of base held by



magnetic chuck. Straight circular work or special forms can then be ground.

A straight shaft and cam attached in place of the regular lead screw and nut,





A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought a more accurate and surprisingly faster way of transferring blind screw holes.

S w

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{16}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

332 Lincoln Ave. Urbana, Ohio

UTILITY AIR PRESS

A Lightweight Air Operated press for General Use where a squeeze action is desired.

- Force 12 Times Air Line Pressure
- Hand or Foot Operated
- · Shut Height 9"
- Stroke 1", 10" between Tie Rods
- · Portable weighs 30 lbs.
- · Economical

Winter Products Inc. 189 State St., Bridgeport 3, Conn.

LUMA Soldering Tool



RESISTANCE TYPE

A proven tool for all soldering jobs large or small. Heats instantly—low maintenance. Safe to operate. Write for details.

LUMA ELECTRIC EQUIPMENT CO.

Producers of Screw Machine Products to Specifications

ONE, FOUR and SIX spindle automatics maximum capacity $2^{\frac{5}{8}n}$ round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3'' round. Castings and Forgings machined maximum 10'' diameter, 8'' length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

SCREW MACHINE SPECIALTY CO.
5600 Butler St., Pittsburgh 1, Pa.

with a spring between the movable section and upright stationary base, can be used to back-off the chamfer on taps, sharpen counter-bores, step drills, and similar tools. Additional information is available upon request to:

Tinker's Thread Grinder Co. Dept. BB, 169 Granby Road South Hadley Falls, Mass.

SPECIAL DIE HEADS ELIMINATE CHASER MARKS

The H & G Special Die Heads for cutting taper pipe threads are a recent development of the Eastern Machine Screw Corp. These accessories control the taper, diameter, and length of the thread. As well as producing accurately tapered pipe threads with precision fit, they eliminate objectionable chaser marks usually left along the thread when a jam cut is made.

The Style "SAMA", illustrated, has been designed for use where a very small light weight head is required; this size is designed to fit on a No. 1 holder. This accessory uses very small high speed insert chasers which give lorg runs before becoming dull; they can be easily removed for sharpening.

The head has a cutting range up to \\4".

and has adjustment for size of approximately .025". The manufacturer claims that this type is particularly useful on Swiss type machines where the light weight of a die head is an asset. Com-



plete information will be supplied upon request to:

Eastern Machine Screw Corp. Dept. BB, New Haven 6, Conn.

SAVE EFFORT • SAVE TIME • BOOST OUTPUT



FOR NO. 0 TO 5%" DRILLS

Ettco KEYLESS SELF-TIGHTENING DRILL CHUCKS

By eliminating the key, Ettco chucks save energy, and speed up drilling. They hold drills rigid, tight, and true—drilling action tightens the grip and centers the drill. There are no better chucks made. Get full details in Bulletin No. 6.

ETTCO TOOL CO.

596 Johnson Ave., Brooklyn 6, N. Y.

Boston, Mass. . Portland, Conn. . Detroit, Mich. . Chicago, III.

We Service all Makes

- Micrometers
- Verniers
- Gear Tooth Verniers
- Adj. Snap Gauges
- Levels
- Cubes

- Indicators
- Height Gauges
 Squares
- Bevel Protractors
 - Surface Plates
- Carboloy Tipping

DIXON and RYAN CO.
Precision Tool Service

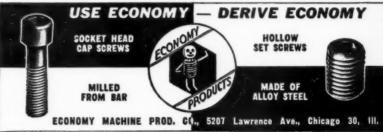
309 S. TROY ST. ROYAL OAK, MICH.



USING STANDARD PARTS







PRECISION TAPPING MACHINE MOUNTS MULTIPLE HEADS

Higher speeds and economy in precision production tapping are claimed for the streamlined Model E tapping machines recently announced by The Cleveland Tapping Machine Co. Employing the interchangeable lead screw feed, the new Model E is said to maintain sustained high-speed, high accuracy production.

In addition to single-hole tapping at higher speeds it is designed for use with multiple heads for tapping groups of



holes, even of different sizes, with a single stroke of the spindle. Adjustable heads may be used where the pattern of the hole varies in production; indexing tables, cross slides, and hopper feeds may be combined with automatic cycling of the machine to provide completely-automatic operation.

The precision-ground, hardened toolsteel lead screw operating in a bronze lead-screw nut with 2" of full-diameter thread contact, insures fidelity of thread form, even in Class 3 and 4 fits. The rigid precision-machined, heat-treated alloy-steel spindle mounted in Timken tapered roller bearings and the supersensitive clutch, in combination with positive coolant control, eliminates tap breakage and greatly increases tap life.

Tapping depth is precisely controlled within .005" by means of a dial on the

side of the head, making blind-hole tapping safe and simple for even an unskilled operator.

Spindle speeds are altered by a simple belt change on multiple pulleys; the operation of the machine may be fully automatic or manually controlled by means of push-button or foot switch.

All sizes of the Model E are designed for strength and rigidity with a welded steel plate base and column and rigidly anchored adjustable work table. All moving parts except the quili, spindle and tap are fully enclosed. All control switches are 110 volts, and the high-reversal tapping motor has built in protection against high temperatures. The new unit is made in six sizes, for tapping or threading either right or left-hand threads. Complete details are available upon request to:

The Cleveland Tapping Machine Co. Dept. BB, Hartville, Ohio.

MASTER HEAVY DUTY TAPER

A new heavy duty taper attachment for lathes is announced by the Master Taper Co. The unit comes in two sizes, 34" and 40" between arms and for V or Flat Ways. It can be furnished for all lathes with a 13" to 26" swing.

Construction is all steel, designed for heavy duty service. The attachment tapers up to 4" per foot, 20° maximum in either direction, 16" length at one setting. The swivel bar has V-Ways with the ends graduated one end in degrees and the other in inches. The sliding fixture is equipped with a long bearing



on the swivel bar with gibs to compensate for continuous usage. The slotted overarm is attached to the cross-slide as shown in the photograph, or with adjustable bar.

To install, the operator simply drills and taps two holes in the cross-slide and disengages the feed nut.

Complete information on this attachment will be sent upon request to:

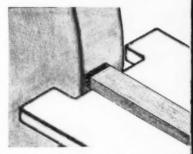
The Master Taper Co., Dept. BB 126 N. Clinton St. Chicago 6, Ill.

"STEELSET" DIAMOND DRESSING TOOLS

Simultaneous action of a large number of cutting points by the use of area-type dressers, impregnated with small, low-cost industrial diamonds set in a special sintered-steel matrix tends toward faster cutting or truing, plus longer life. This, in turn, results in lower costs per dressing.

The Fish-Schurman Corp.. announces their new "Steelset" Area-Type Dressing and Truing Tools for economical dressing. There is only an infinitesimal loss if one of the many small stones is damaged or pulled out of the matrix, since many others are around or behind it to take its place. The "Steelset" unit may be used to completion without turning or resetting for either dry or wet operation. By selecting the proper

grit sizes and procedure, both the truing and dressing of work may be carried out simultaneously in a fraction of the time consumed by other methods, according to the manufacturer.



Complete technical data on these units is available by writing for Bulletin No. DT-323 to:

The Fish-Schurman Corp., Dept. BB 230 E. 45th St., New York 17, N. Y.



MAKE WHEEL CHANGES IN SECONDS! New CORLETT-TURNER GRINDER

You can get better, faster freehand grinding with a Corlett-Turner G3 Grinder because:

- Wheels are individually mounted on tapered arbors can be changed in a few seconds—no tools required.
- Arbor mounting assures true running wheel at all times, eliminating repeated wheel dressing.
- Three-speed pulley provides correct grinding speed for wheels up to 4".
- Built-in safety feature prevents use of wheels of larger diameter than recommended for speed setting.

These and 10 other features built into Corlett-Turner G3 Grinders assure more efficient grinding by making correct grinding practice the easy, natural thing to do.

WRITE for your copy of "MORE EFFICIENT SMALL

TOOL GRINDING"

Note: Desirable territories available for qualified representatives. Write for further

CORLETT-TURNER COMPANY 1001 S. Kostner Ave., Dept. 21, Chicago 24, Illinois

details



28

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

TOOL HOLDER SAVES 40% ON LATHE TIME

Easily fitted to the compound of most engine lathes, the Multi-Duty Tool Holder illustrated is claimed to save up to 40% on lathe time. It facilitates drilling, reaming, tapping, boring, turning,



facing, recessing, forming, threading, knurling and cutting off in one chucking without the use of a tailstock. Large solid steel base and hardened and ground working and locating parts assure long life and accurate performance. For further information, write:

Airo Products Co., Dept. BB 2938 Denby Ave. Los Angeles 26, Calif.

SAFETY GOGGLES FOR WELDING AND GRINDING

A new line of safety goggles is announced by Jackson Products Co. The goggles are made in two types, one recommended for welding, cutting, and brazing, the other for chipping and grinding.



Welding goggles take 50 mm. lenses, shades No. 3 through 6, protected by cover

glasses. The eye-cups are of molded plastic, with ventilating screens and baffle plates on the outside to prevent fogging, and to protect the eyes from flying particles and stray light rays. Type W-50 is equipped with a plastic headrest and telescopic arms with concealed springs. The goggles do not interfere with prescription glasses.

Grinding goggles are similar, but have clear, hardened lenses, a ventilating screen as protection against flying particles, but no baffle plates. Complete information on these items may be secured

from:

Jackson Products Co., Dept. BB, Warren, Mich.

MOLDED PLASTIC GAGE BLOCK HOLDERS

The George Scherr Co. has designed new gage block holders in molded Durez plastics. These holders give greater protection and longer service and reduce case costs by eliminating wooden boxes. The molded holders are produced in one molding cycle, with holes of the various required sizes and identification markings molded in. A round cavity with raised sides holds the optical flat used to check the gage blocks for size and wear. The holders are set into rectangular boxes with hinged tops and snap-type



locks. The phe ograph shows one of the Durez inserts and an Ultra-Chex Inspectoset, one of the gage block sets in which the inserts are used. Ultra-Chex gage blocks are accurate to within eight millionths of an inch on sizes up to one inch and eight millionths per inch on larger sizes, at a temperature of 68° F. Additional data may be secured by writing:

Geo, Scherr Co., Inc., Dept. BB 200 Lafayette St. New York 12, N. Y.



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision preloaded ball bearings. Two good sizes 3/4" and 1". 30 Precision attachments available.



Open Cone Lathes worldknown. Four sizes, with compact under-bench Motor Drive Unit.

Stark Precision Bench Milling Machine. Plain and Spi-

ral Models



"ELECTROBLAST" High Speed Muffle Furnace, Two excellent small sizes.



Grinding Grinding Grinding Grinding SAVE 40%

DIAMOND WHEELS

4x1/8x11/4-D 120-100-1/8 Resin\$23.50 eα.
7x1/8x11/4-D 180-50-1/8 Resin 26.50 eα.
8x1/2x11/4-D 100-100-1/16 Resin 74.00 eα.
4x1/4x11/4-D 120-100-1/8 Metal or
Vitrified 44.00 eq.
6x3/4 Face x 11/4" Hole Ex-Cell-O
Type Cup Wheel D 180-50-1/8
Resin or D 120 or 220-100-1/16
Metal\$79.00 ea.

GREEN GRIT SILICON CARBIDE 60 or 120 arit F. I Hardness

		- 3.				
14×4×11					11 50	
				\$	11.50	ea.
10x2x7 P	late 1	Mount	ed G	Famuter		
Type					6.50	
14x2x11/4					7.00	
12x2x11/4	Straig	ht W	heels	********	6.00	ea.
10x11/2x2				********	4.50	
7x1/2x11/4	Straig	ht W	heels		1.70	ea.

HEAVY SNAGGING WHEELS

24x2½x12 High A14O	Speed	Resinoid	25.00	
12x1x11/4 High		Resinoid	25.00	ea,
A24Q	ring Cu	os Al6Q	4.50	

CENTERLESS · CYLINDRICAL

20x5x12	grade	SOL	thru	0	*******	3	20.00	ea,
20x4x12								
20x11/2								
14" or	12"×1"×	5" g	rode	60L	thru	0	4.50	ea.

MISCELLANEOUS	
Abrasive Cloth Rolls-36, 60, 80,	
Abrasive Cloth Rolls—36, 60, 80, 100, 120, 150, 240, 320, 400x1½ or 2" wide	\$1.75 ea.
Special—Special 3x3/8x1/4 or 6x3/8x	
11/4 46] Mounted Points—1/8 or 1/4" Shanks	.40 eq.
Abrasive Cutoff Wheels 12, 14,	100 600
16 or 18"x1/8"x1	1.35 ea.
Tool Room Wheels — Type 1, Type 6 or Type 11 4"-6" Diam. x	
11/4 Hole	.90 ea.
MX Wheels-Mtd. Points or Straight Wheels	35 err

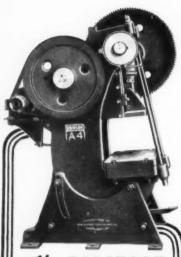
THE ABRASIVE SPECIALTIES DIVISION

All above as well as hundreds of other

sizes available for immediate shipment from stock.

The Metal Removal Co. Chicago, III.

1645 No. Wells St. PHONE: HUMboldt 5944



The ROBINSON Inclinable PUNCH PRESS

The new and improved Series A Robinson Punch Press is noted for safe, dependable operation. Sturdily built and employing finest construction features, a Robinson Series A offers years of trouble-free operation at minimum maintenance cost. Five sizes now available for immediate delivery.

New Albany Machine Mfg. Co.

ROBINSON

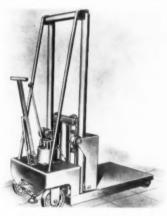
Inclinable
PUNCH PRESSES

HYDRAULIC HIGH LIFT TRUCK

This 3000 pound capacity unit has been added to the Lyond-Raymond line of Hydraulic High Lift Trucks. It is equipped with 4-wheel suspension, a synchronized steering device and towing eye as standard equipment, and is said to offer greater stability and maneuverability, as well as quick adaptability to power driven trucks.

The new truck is a mobile, easily operated truck that (1) lifts, elevates, and transports capacity loads, (2) supports heavy overhanging work, (3) serves as a feeding table for heavy or clumsy operations, (4) simplifies the handling and positioning of dies and other tools and fixtures, and (5) is useful in tiering skid loads and stacking materials and containers, according to the Lyon-Raymond Corp.

The fork type tubular frame combines structural strength with light weight. It provides a 30" x 36" load platform which is supported by concave rollers fitted to the 83" tubular uprights. Power is furnished by the 2-speed Hydraulic hand pump mounted on the truck frame.



The platform has an elevating range of 6" to 54". The truck is equipped with two 10" dia. by 2" face semi-steel front wheels, and two 5" dia. by 3" face semi-steel rear wheels, all with Timken roller bearings. Additional information can be obtained from:

Lyon-Raymond Corp. 4269 Madison St., Dept. BB Greene, N. Y.





It's unique! It's a time saver! It's practical! It's precision built! This amazing QUICK STOP SPINDLE is a boon to many shops such as plating, metal finishing, stamping, emblem shops and small parts manufacturers.

WE ARE SOLICITING FOR DISTRIBUTORS

LOUIS C. RATHBUN CO.

CAMS FOR B & S AUTOMATIC SCREW MACHINE

An automatic screw machine cam for use on Brown & Sharpe units is a recent development of the Alco Tool Co. These accessories are precision machined of hardened steel to meet the closest tolerances. The cam lobes are milled to exact dimensions. The cams are designed



for extended production without requiring adjustments; they allow greater ease in machine set-ups, due to proper feeds and speeds selected. Descriptive bulletin is available from:

The Alco Tool Co., Dept. BB Bridgeport 4, Conn.

ARTUS ARBOR SPACERS The COLOR tells the THICKNESS



ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

CONVENIENT TRIAL OFFER Handy Spacer Assortment

10 ea. .001 — .0125 thick 5 ea. .015 — .030 thick

100 SPACERS IN ALL

 $1'''_{8}$ " — \$3.10 11/4" — \$3.80 11/2" — 4.70

Other standard sizes also available.

Illustrated Folder Free.

Immediate Delivery on

Spacers, Gaskets, Shims

INDUSTRIAL PRODUCTS SUPPLIERS

106 Water Street, New York 5, New York

SHOCKPROOF CARTRIDGE FUSES

A new line of renewable Cartridge Fuses, designed for shockproof servicing and rapid renewal, is announced by the Solar Electric Corp.



They are distributed under the tradename "Solar." The knife-blade type fuse has only two main parts: a cartridge case with no exposed ferrules or bolts, and a link-blade assembly. One end of this assembly is sealed to an inner collar on the case by a fibre washer backed

by a brass plate; on the other end, a threaded brass plug, permanently fast-ened to the knife-blade assembly, screws inside the casing. When blowouts occur, gases, heat and pressure are safely dissipated through a "controlled vent pasformed between the V-shaped threads of the brass plug and the squareshaped case threads.

Solar Fuses in the ferrule type are equipped with renewable "timed-lag" fuse-links which give full protection to equipment and wiring against shorts and damaging overloads, yet reduce blow-outs due to momentary overloads and current surges. The links are notched for fool-proof fitting into correct assembly position.

The fuses are available in sizes from 3 to 600 amperes, 250 or 600 volts; Underwriters Laboratories, Inc. approved. For complete information:

Solar Electric Corp., Dept. BB Warren, Pa.

GRINDERS

Designed to handle high speed or vitri-Designed to handle high speed of vitri-fied wheels. Describes drill grinders, wet grinders, bench grinders, pedestal grinders, etc., briefly and gives picture of each. Folder. The Hisey Wolf Ma-chine Co., Dept. BB, Cincinnati 25, Ohio.



Completely automatic - one operator tends 6 or more presses.

High speed production-9,000 to 40,000 pieces per hour.

Cuts light metals and other materials in lengths to 9 inches.

Low tooling costs.

WRITE FOR INFORMATION

A PRODUCT OF

Ace Tool & Die Works

125 E. McMICKEN AVE. CINCINNATI 10. OHIO

INTERCHANGEABLE TYPE HOLDER FOR THE MACHINE STAMPING OF METALS

A new device for multiple straight-line stamping of letters and figures has been developed by New Method Steel Stamps, Inc. With this marker, instruc-



tions, nameplates, and similar information can be machine-stamped in a single operation.

The marker can be used for many purposes since the lines of type are interchangeable. The individual type characters are set into the holder in the same way that type is set up in a print shop. Each individual piece of type is slotted (see cut) so that the entire row of monotype and spacing slugs can be held in place with a flat locking pin.

The retainer of the type holder has a hardened steel anvil against which the type seats itself. The outer case of the retainer is of hardened and tempered tool steel to insure long life under severe service conditions. All insert monotypes are hardened and ground to a standard size and length for accurate alignment when the type is assembled in the holder.

The device can be used either in the regulation mechanical marking machines or in a variety of punch presses. The design permits it to be furnished in a variety of sizes and type capacities to suit individual marking requirements. For complete information, write:

New Method Steel Stamps, Inc. Dept. BB 147 Jos. Campau Ave., Detroit, 7, Mich.

MA NEW ERA IN INSPECTION .. The Sine Bar is Dead!



For Fast, Accurate, Low-Cost Precision Inspection



• Portable

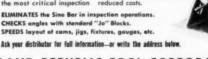
· Ready for

Instant Use

combined with accuracy and precision in inspection. So simple that even a semiskilled mechanic can perform the most critical inspection

Here's the answer for speed operation in a fraction of the time normally required. The Indexmaster provides the utmost in faster inspection, greater output and reduced costs.

CHECKS angles with standard "Jo" Blocks.





Sales Office: 1265 UNION COMMERCE BLDG., CHerry 1937 . Main Plant: 9615 MEECH AVE., Dlamond 7300





REVOLVING TIP LATHE CENTER

LOWEST PRICED "LIVE" CENTER ON THE MARKET.

MORSE TAPER SHANKS

- Runs cool and yields under load to compen-sate for work expansion Same dimensions as standard solid centers
- Saves time-saves meney work & outlasts -saves ordinary centers
- No. 2-\$6.25 No. 3-\$7.75 No. 4-59.75
- ASK YOUR DEALER FOR DETAILS



H. VANDERWALL COMPANY 440 GOLDEN GATE AVE. SAN FRANCISCO 2. CALIFORNIA

Save TIME and MONEY

vields



Universal Hand SPRING

Every shop and tool room needs it . . . a strong, dependable unit . . . quickly set up in any vise.

Increases production of hundreds of sizes of springs, Right and left.

Write for illustrated folder, giving complete details

BLANER MFG. CO. Corner Meek & Elm Sts.

SHARON

PENNSYLVANIA

OSCO WAY CURTAINS FOR MACHINE TOOL BEDS



Protects ways on Planers, Mills, Grinders, Boring Mills, etc. - Keeps chips and abrasive dirt out of ways - Prolongs life of machine — saves costly repairs and overhaul time.

Rollers constructed of seamless steel tubing with special long life springs. Curtain is of rubberized material impervious to oil and cutting compounds.

3 Standard sizes Special sizes to order

Installed easily with single brackets. TOOL SUPPLY CO.

40 Custer

Detroit 2, Mich.

HIGH GRADE TOOLS SPECIAL GAGES CAM BLANKS

AMERICAN TOOL WORKS, INC. HARTFORD, CONN.

26 FRANCIS AVE.

HOWALD CARBIDE MILLING CUTTERS

A newly developed line of Carbide Milling Cutters especially designed to give maximum machining life to Carbide Blades, is being marketed by the H. T. Howald Machine Wo:ks.



The "Sharp Blade Lock" on Shell and Face Mills and the "Cone Blade Lock" on the Replaceable Blade End Mills (illustrated) provide a means for replacing and making blade adjustments for setting or grinding.

The blades are of standard square stock without serrations or grocves. This feature allows blades to be ground to any combination of angles, prior to their insertion in the cutter head; permits less material to be removed when resharpening, thereby, reducing grinding time and assuring longer blade litc. Blades of cast alloy or high speed steel can be used.

The combined design advantages make these Carbide Milling Cutters adaptable and flexible for all milling operations—cuts set-up time and minimizes maintenance costs. The Replaceable Blade End Mills are suitable for small milling jobs. Cutter life is increased by the Replaceable Blade feature. Made from 1½" to 3" diameters with 4 to 6 blades. The Shell Mills for light or heavy duty range from 3" to 6" diameters with 6 to 12 blades. Complete information available from:

H.T. Howald Machine Wks., Dept. BB 182 Sigourney St., Brooklyn 31, N. Y.

LAPEER MOVES SALES OFFICE

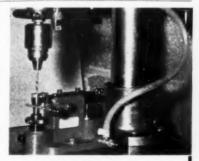
Lapeer Mfg. Co. has moved its General Sales offices to 2906 W. Grand Boulevard, Detroit 2, Mich. The production plant was recently moved to Lapeer, Mich.

NEW POR-MATIC

AIR-OPERATED

DRILLING FIXTURE

• This new POR-MATIC air-operated Universal drilling fixture is rigid, sturdy and machined to exact tolerances. It will handle round stock 1/16" to 1" and by using a special upper beam or drill bushing carrier 1 1/2" can be received for cross drilling. This fixture can be



Patent Pending

mounted on any of the regular bench type or floor type drill presses in a matter of minutes. Depending on type of material and diameter of hole size, it will increase production from 33% to 200%.

Price \$75.00 Air Regulator Extra \$8.35

Send for literature giving complete description.

THE PORTER MACHINE CO.

3100 ENYART AVE

•

CINCINNATI 9. OHIO

MEAD DRILL PRESS FEED AND TIMER CONSTITUTE "ONE-MAN FACTORY"

The use of compressed air power for certain work-feeding and workholding operations was introduced by the Mead Specialties Co. several years ago in their prod-uct called the "Work Feeder." This unit increased production using a reciprocal motion of a slide to close and open a set of jaws, the slide actuated by an air cylinder. A newly developed product of the manufacturer which further develops the idea is the new Rotary Work Feeder: two or more operations can be performed at the same time, with the same set-up. As shown in the cut, brass valve bodies are being drilled and reamed at two stations

on the rotary table. The parts are hand loaded, and ejected by cam. Once the air line is opened, the operator merely loads the parts as the table indexes. This "One-Man Factory" unit consists of the following component part, as des-

ignated by the numbers in the cut:
1. Master Valve, which stops and starts the entire system.

2. Mead Pneumatic Timer, which controls the number of cycles per minute, and actuates the Rotary Work Feeder.

2a. Two-way Speed Control Valve,

regulating the control of the Pneumatic Timer.

2b. Adjustable mounting bracket for the Pneumatic Timer.

Drill Feed operating valve.
 Drill Feed power cylinders.

5. Drill Feed speed control valve.

6. Tee connection to supply both cylinders.

7. Two-way Speed Control Valve for Rotary Work Feeder.

For complete information on this unit. as well as the complete line of Mead air-operated devices, write:

Mead Specialties Co., Dept BB 4114 No. Knox Ave.

Chicago 41, III.

BULLDOG TOOL HOLDERS PREVENT SLIPPAGE

A new series of drop forged tool holders made from selected analysis steel is manufactured by the R & D Toolholder Corp. These "Bulldog" holders are heat treated and hardened, to retain the strength, toughness, and wear resistance of the steel. They are of two basic types, Turning and Cut-Off Tool Holders.

Cutting bits are held rigidly in the holders, because a special clamping pin engages nearly the entire length of the bit. A light pressure of two flush-type set-screws on the clamping pin locks the tool bit or blade in position with a viselike grip. When the bit is removed, the

clamping pin is held in position by a dowel, easily removable when necessary.

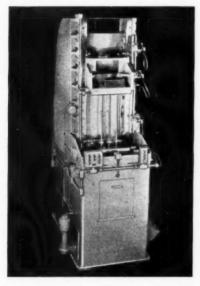
These accessories are claimed to hold the tool bit rigidly in both vertical and horizontal planes, an essential feature for carbide tipped bits. The bit is gripped on nearly the entire length, virtually eliminating the possibility of slippage, since the bit and holder become practically a single unit. There is no mutilation of bits by set-screw marks, nor broken bits from set-screw pressure, since set-screws do not touch the bit itself. There is no chatter of tool bits, and both roughing and reverse finishing cuts can be made with no adjustment of the holder.

Complete specifications on the Bulldog Cut-Off and Turning Tool Holders may be secured upon request to:

R & D Toolholder Corp., Dept. BB 62 Ryle Ave.. Patterson 2, N. J.

LAPOINTE FEATURES BROACHING MACHINE WITH 20-TON STROKE

The Model V-3 Vertical Hydraulic Pull Down Broaching machine perfoms jobs in which the center distance between simultaneously broached holes must be held. Although similar in construction to the standard V-3 type, this machine is heavier throughout and incorporates a positive broach guide for maintaining



vertical accuracy alignment. Provided with a standard in and out fixture, it is tooled to broach three different sizes of automobile clutch hubs at a time. This machine with its rotor cut broach can cut multiple holes and hold their center distances to within .0005 of each other.

For further information, write The LaPointe Machine Tool Co., Dept. BB, Hudson, Mass.

For complete technical information, write:

The LaPointe Mach. Tool Co., Dept. BB Hudson, Mass.

La Bahn Automatic Roll Feeds



- COST NO MORE THAN OTHER COMPARABLE FEEDS
- SIMPLE DESIGN FEWER PARTS TO WEAR
- PRECISION BUILT FOR CONSIST-ENT ACCURATE FEEDING AND LONG LIFE
- UNQUESTIONABLE RECORD OVER MANY YEARS IN THE SMALL SHOPS AND THE LARGER NA-TIONAL ORGANIZATIONS
- IMMEDIATE DELIVERY OF MOST
 SIZES

Standard units provide up to 18" advance. Larger feeds with longer advance can be supplied.

We also manufacture stock reels, stock straighteners, wire straighteners and scrap cutters.

Write today for our new literature.

LA BAHN
MACHINE & MFG. CO.
542 LINCOLN HIGHWAY
MENLO PARK, N. J.



low One Manufacturer Profits BEAR DY-NAMIC BALANCING

Reports the Dynamic Air Engineering Co. of Los Angeles: "Bear eliminates he "Wobblies" of un-balance in high peed axial flow propellers faster than 10 per hour to a 3 mil displacement olerance." Here, as always, the Bear nachine is so small in size, and so juick, that the operation fits readily nto production.

any shop hand can learn Bear-Balanc. ng in less than a day. Every Bear nachine is widely adaptable within its ange. Each balances bodies to the ecognized standards. All are very easonably priced. Write for new terature . . . chase the "Wobblies." of y-namic and static un-balance . . . nprove both product and sales! BEAR AFG. CO., Industrial Div., Dept. 4-20, Rock Island, Ill.



COMBINATION

STANDARD COMPARATOR USEFUL FOR CHECKING PLUG GAGES

Provisions for five interchangeable tables and the use of standard indi-cators are features of the new Model 108 Comparator developed by the Standard Gage Co. This instrument is therefore suited to a wide range of production and inspection measuring jobs. When equipped with the Micronar Indicator, it affords an effective means of checking plug gages. Any AGD dial indicator of the No. 2 or No. 3 size having standard lug type back can be used. Thus, an indicator having graduations appropriate to the accuracy desired may be mounted on the comparator.

Raising, lowering, and approximate positioning of the indicator support arm are facilitated by a rack on the rear of

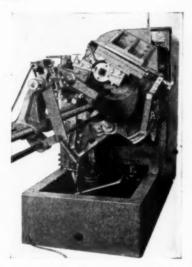


the column. Fine adjustment for setting the comparator to a standard is effected by a wing handle. Pressure of the contact point on the work piece can be regulated by means of a knurled bushing. A reed mechanism within the head pre-vents side thrust from reaching the indicator and thus adversely affecting accuracy. Tables are available as follows: 1½"x4" serrated, 6"x4" serrated, 1½"x4" plain, and one with 1½" diameter rolls for checking lobal conditions. For information, write:

Standard Gage Co., Dept. BB, Poughkeepsie, N. Y.

AUTOMATIC CUT-OFF MACHINE HAS

A new model Automatic Cutting-Off Machine is announced by The Modern Machine Tool Co., for cutting tubing, pipe, or bar stock; it is similar in design, and uses the same cycle as the manually operated machine manufactured by this firm.



The automatic machine is much heavier than the manual type. The cross slides are set at an angle for better chip clearance. The double live roll stock feed will pass any length of stock through the spindle, and as the stock strikes the trip plate on the stop, it starts the automatic cycle. This cycle takes about 1½ seconds plus cutting time.

Complete specifications on both machines is available upon request to:

The Modern Machine Tool Co., Dept. BB, Jackson, Mich.

The Robertson Manufacturing Co., Morrisville Place, Trenton 5, N. J. was omitted from the 1947 Directory of the Machine and Tool Blue Book due to an oversight in the compilation. This firm should have been listed under the category of "Grinding Wheels". The firm manufactures Vitrified Grinding Wheels, Mounted Wheels, and Segments.



100% ELECTRONIC CONTROL ...

Lucifer Electric Heat Treating Furnaces made in 2 sizes. Both up to 2000° F. New Improved Heating Elements and Backing.

Write for literature

Price only \$425

GILBERT S. SIMONSKI MFG.

NEW FORK TRUCK WILL TIER TO CEILING HEIGHTS IN LOW CLEARANCE BUILDINGS

Offering lifting heights never before achieved by trucks of its capacity, Automatic Transportation Company's Skylift Brawny, newest addition to its line of electric industrial trucks, is pictured tiering pallet boxes.

The Brawney, in five models, is built to handle loads of four to eight thousand pounds. With a standard collapsed height of 83", the four, five and six-thousand pound models of the Brawney will lift to 124"—at least five inches higher than previous model trucks of this size—and the seven and eight-thousand pound models will lift to 115", similarly higher than previous trucks in its range. At the same time, hydraulic lift telescopic action enables the trucks to tier under ceilings as low as 84", the forks and uprights being raised independently by separate rams.

The Brawny's design features highpressure hydraulics, making it possible for the trucks to be smaller, lighter and more efficient than ever before, and the Newmatic controller, functioning as the electric counterpart of automotive automatic gearshift. Complete details will be



supplied upon request to:
Automatic Transportation Co.
Dept. BB, 149 W. 87th St.
Chicago 20, Ill.

OIL GROOVING made easy by WICACO

The WICACO Continuous Oil Groover can cut grooves of all descriptions INTERNAL or external — CONTINUOUS or intermittent.

Operators need no special training to produce oil grooves with this highly flexible machine. Change from one grooving job to the next is readily done without delay. Its upright spindle and chuck permit rapid loading and unloading of work without stopping the machine.

It will pay you to investigate the remarkable, low cost results the WICACO Continuous Oil Groover offers. Write today—outline your oil grooving problem and complete information will be sent without obligation.



Wayne Junction, Phila. 44, Pa.

ILLUMINATED INSPECTION



"Lenox Detects Hidden Defects" while exploring the dark holes of industry — guns, hollow shafts — Refinery, well drill and other tubing, irregular dark spaces.

BORESCOPES

American Pioneers—Twenty-three years. Give diameter, length and shape of cavity.

2008 CHANCELLOR ST.





We are now ready to add more distributors to handle Schmarje Carbide-Tipped High Production Tools. If this interests you — write

SCHMARJE TOOL AND ENGINEERING CO.

PLUNKET IMPROVED VISES

We make a complete line of modern vises milling machines and

for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked. In ordering this vise give size of slot in table: No. 10—6° jaws, 11½° deep, opens 57

wt. 45 lbs. \$55.0 No. 20—10" jaws, 2½" deep, opens 8½", wt. 120 lbs. \$75.0

Best material and workmanship. Prices are net f. o. b. Chicago. Dealers' inquiries are solicited. Write for folder TODAY.

J. E. Plunket Machine Co., CHICAGO 12, ILL.

CUT YOUR COSTS! (THE EASY WAY)

Send your cutting tools in today for Sharpening, Salvaging, Reconditioning

SAVE UP TO 70%

Rutland

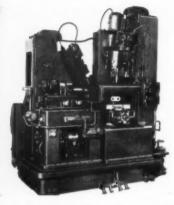


TOOL SERVICE DETROIT 3, MICH.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

SNYDER AUTOMATIC HANDLES FIVE MACHINING OPERATIONS ON INTAKE MANIFOLDS

Drilling, spotfacing, chamfering, com-



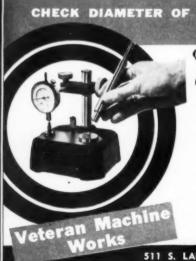
oination drilling and tapping operations on cast iron intake manifolds are performed in this new Snyder special automatic machine. Production rates are 160 pieces per hour (80% rated efficiency), indicating substantial savings.

High speed tools are employed, operating in special Snyder hydraulic units, powered with individual electric motors of requisite size for each station. The work-cycle consists of load—index—rapid approach—feed and rapid return, all with the exception of loading performed in an automatic cycle.

The hydraulic work units are mounted on an automatic index table with four stations. Parts are clamped manually with quick-acting cam mechanisms. A safety stop button is provided on the control panel.

Stub tooth 20° pressure-angle gears are employed in the heads to provide adequate strength for trouble-free operation. Oil and pressure grease lubrication systems are employed. Machine is of welded steel construction, properly normalized and ribbed. Complete opera-tional data will be sent upon request to the designer and manufacturer:

Snyder Tool & Eng. Co., Dept. BB, 3400 E. Lafayette St. Detroit 7, Mich.



OUICKLY, EASILY WITH THE Center Master (ic

No skill needed-simply hold the work on the gage pin as shown in the illustration. Read the diameter of the center hole and 90° and 82° countersunk holes directly on the indicator.

CENTER MASTER GAGE provides the only practical method of actually measuring the diameters of center holes countersunk holes with extreme accuracy. "No time-consuming set up "Direct indicator reading 'No guessing 'No calculations involved.

Obsoletes flush pin gages. Write for details

511 S. LAFLIN ST.

CHICAGO 7, ILL

POWER SQUARING SHEAR HAS 10-GAUGE CAPACITY

Wysong and Miles Co. announces a new series of semi - steel squaring shears from 6 foot, 10 gauge mild steel capacity, to 8 foot, 12 gauge mild steel capacity.

These squaring shears are of massive semi-steel construction throughout with weight properly distributed to prevent twist or spring, and to insure accurate alignment. New precision features include a hand wheel operated, ball-bearing, parallel back gauge adjustable to .0078" by dial reading.

Sheets can be cut to size within a few thousandths of this set-

The compensating holddown has a spring activated plunger in each foot. Each plunger automatically adjusts itself to the thickness of the metal and securely clamps even small strips of material that come under only one foot. The treadle activated, multiple disc



clutch takes hold smoothly and quickly under a full load with a minimum of shock. For safety, a non-repeat unit on the clutch can be set to stop the shearing action after each cycle.

Send for illustrated bulletin to: Wysong and Miles Co., Dept. BB Greensboro, North Carolina



Hartford Special also makes the "Four-point" Milling Vise and the "V-Block" Fixture proven time and money savers on Milling, Boring, and Inspection Set-ups.

for QUICK INDEXING

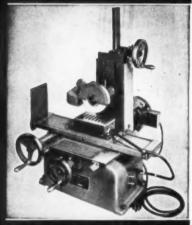
Milling . Drilling . Grinding . Jig Boring . Planing . Slotting Boring and other Operations

Illustrated in the Super-Spacer set us with drilling attachment. Flexibility of design allows for adjustment to various jobs within the range of the attachment. In this case the Super-Spacer permits quick-as-a-flash indexing on a job that calls for drilling spaced holes in a circular path. This is but one of the many time saving applications of the Super-Spacer. If your shop can use quick but accurate indexing, write our Dept. 37.



The Hartford Special Machinery Co. CONN. HARTFORD 5.

SANFORD



High-Speed BENCH SURFACE GRINDER

ACCURATE WITHIN .0001

A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

WRITE FOR BULLETIN

SANFORD MFG. CO.

1020-28 Commerce Ave. Union, N. J.

CENTER MASTER GAGE SIMPLIFIES GALGULATIONS

Announcement is made of a new gage, the Center Master, by the Veteran Machine Works. This model is described as an advance in the method of checking the size of 60° center holes; models are also available to check the sizes of 90° and 82° countersunk holes. The Center Master is said to be particularly applicable in machining or grinding operations when locating from the center holes, where the over-all length and the size of the center holes must be held to close tolerances.



The gage shows the diameter of the center holes by a direct indicator reading, with no set-up or calculation involved. The direct reading method depends upon a simple principle; when the gage pin enters the center hole, it travels a certain distance, depending on the size of the center hole. If the indicator measured the actual travel of the pin, it would only show the depth of the hole to a theoretical sharp point. However, the indicator is a pre-determined distance further from the fulcrum of the lever than the gage pin, and the travel of the gage pin is translated from a measurement of depth to a measurement of diameter. The indicator reading, therefore, always gives the actual diameter of the center hole.

Further details on the Center Master will be furnished by:

The Veteran Machine Works, Dept. BB 511 S. Laflin St. Chicago 7, Ill.

RAPID ACTION HOLDING DEVICE

Detroit Stamping Co., manufacturers of toggle clamps, has developed a new heavy duty plunger clamp, Model 640, called "The Ram", because of its power and rapid action. It is claimed to be capable of exerting over 2500 lbs. normal



pressure in tests; the Ram's outstanding feature, according to the manufacturer, is that the handle is down when the clamp is closed, a desirable factor machines or fixtures where space is lin ited. The operating motion is downwa and away from the work; the heavi loaded handle provides split-second clo ing, since merely tipping the lever w close the clamp with considerable pre sure, the makers claim.

This accessory is primarily a fast ac ing holding device; it is also adaptat to such conversions as light arbor, pun of wood or metal parts in large fi tures, in batteries for laminating beams or other heavy wood work, for heavy duty clamping of parts f milling, drilling, welding or other pr duction operations requiring unifor and powerful action.

The Ram measures 1534" overall leng and is 3¼" high, when closed. T plunger travel is 1¼", and pressure m be adjusted by turning a %" bolt in t tapped end. The base is a casting co taining a bronze plunger bushing; t toggle link is of hardened steel. Col plete details available from:

Detroit Stamping Co., Dept. BB 347 Midland Ave., Detroit 3. Mich.

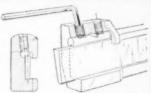
BULL DOG TOOL HOLDER



CUT-OFF



JUST A FEW ADVANTAGES OF BULLDOG HOLDERS



- (1) Rigidity. Bulldag holders will not permit a tool bit or cut off blade to shift, slip, weave or chatter. Essential where carbide and cast alloy cutters are used. (2) Bits. Can be used efficiently as short as you can
- grind them
- (3) Blades. Will re-locate after grinding within .0001" of original position in holders after each re-grind. Blades also can be used as short as possible to grind them.

There are many more time and money saving advantages to Bulldog holders. Let us tell you about them. Special tool holders can be made to your specifications. Quick delivery. Write for illustrated booklet



R&D TOOLHOLDER CORP. **62 RYLE AVENUE**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

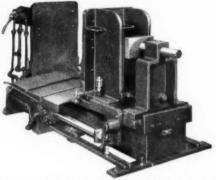
STANDARD PERMANENT MOLD OPERATING MACHINE

This machine model 247, incorprates four rugged main castings, pasisting of a bed, moving platen, ationary platen and a knock-out laten. It is designed and engieered to maintain a square contion between the two mold holding platens, and provide equipment that will produce permannt mold castings with a minimum t waste. Certain unique features iminate many manual operations sually required with the contional type of equipment, acording to the manufacturer, the tandard Machinery Co.

A guide groove 4" wide by 2½" eep through the center of the bed ermits all platens to be fitted the bed and held square by eans of tongues secured to the

aten bottoms. The moving platen is upped with two adjustable tapered enter guide gibs, assuring that a square indition, both horizontally and vertically, lative to the stationary platen is mainined within close tolerances, throught the movement of the moving platen, the center guide groove runs the full night of the bed. This feature also enbles the molds to be kept in proper ignment at all times. The moving aten is also equipped with adjustable pered hold-down gibs which maintain s squareness with the bed under full perating pressures.

The unit is provided with hydraulic ock absorbers which permit a cushiong of both the opening and closing rokes. An adjustable knock-out bar d plate permit the incorporation of hock-out pins in molds for the easy ection of finished castings. The last ree inches of knock-out stroke are



cushioned by means of springs mounted on the knock-out platen. The platens are equipped with eight %" die holder holes and the moving platen is provided with eight %" holes for knock-out pins. All die holder and knock-out holes are jigbored and reamed. T-slots instead of die holder holes can be furnished if desired.

This machine is equipped complete with standard type air oiler, filter, pressure reducing valve, and four-way operating valve. It is ready to operate by merely attaching to a shop air line.

The standard machine is equipped with two 6" air cylinders providing 18" of stroke. Complete information on the Permanent Mold Operating Machine is available upon writing to:

Standard Machinery Co., Dept. BB, 347 Indiana Ave. Grand Rapids 4, Mich.

Combination Can't Be Beat! No. 000 ANGLE VISE for MILLING-DRILLING GRINDING Ets. Solve Difficult Angle John. Get QUICK, ACCURATE, SETUPS and save time, money, rejects. A. cutately machined and graduated to fully sonial. Steps 24% plain or grooved, The Combination Can't Be Beat! No. 258 MILLING ATTACHMENT Censel Seconds! Mill. Slot, Grind, Groove, Square Contact The Combination Can't Be Beat! No. 258 MILLING ATTACHMENT Censel Seconds! Stanta Stanta

Save Time

Save

Money

JEFFERSON Endless Belt Sanding Machine

Eliminate waste of time and money. Do away with manual handling. This machine finishes wood surfaces to satiny smoothness at 5,000 surface feet per min-ute. Large flat, convex or concave sur-

ORDER TODAY FOR 3 WEEKS DELIVERY REPRESENTATIVES: WRITE FOR

JEFFERSON MACHINE TOOL CO. 700 W. 4th ST. CINCINNATI 3. OHIO

SEE BETTER MAGNI-FOCUSER

Here's an aid to GREATER PRODUCTIVITY

Pat. U.S.A

EVERYONE in your plant who does precision work can do it easier, faster, safer, better by wearing a Magni-Focuser. This binecular eye-loop enables you to see an object sharply magnified with the comfort and clarity of normal vision. Relieves eye-strain—lessens fatigue—reduces accidents. Allows free use of both hands. Available in different magnifications, from 2% at \$8.50 to 3% at \$10.50. If your distributor cannot supply you, order direct.

Money refunded if Magni-Focuser does not help you see better.

EDROY PRODUCTS CO. 478 Lexington Ave., New York 17, N. Y. CARROLL JAMIESON LATHES 15" AND 16"

12 Speed Geared Head Motor Drive Timken Mounted Spindle

Modern Design-Liberal Dimensions



ROLL & JAMIESON LACHINE TOOL CO. ONIO, U. S. A.

Your Shop Needs BOTH Machines



. . for sawing, filing and lapping of straight lines, sharp corners and flat surfaces.

The MILWAUKEE Profile Grinder

. . for high speed precision grinding of curved and irregular contours.



CHAPLET & MFG. CO.

1027 S. 40th ST., MILWAUKEE 4, WIS.



Bulletins

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

AUTOMATIC DRILL PRESS FIXTURE

A new automatic power feed for drill presses which can convert a singlemindle unit into a production machine as been developed by the General Paific Corp. This unit, called the "Hydra-Orill", is air operated, hydraulically conrolled, and operates at line pressures of from 85 to 125 lbs. The hydraulic feed s infinitely variable, and may be adusted to the individual operation by heans of a graduated dial.

The new device stresses fast traverse nd rapid return to the work piece. The troke equals the full travel of the drill press spindle itself. Since the unit is bot controlled, it permits operator free-om of hands; by its attachment to a ress, it does not interfere with the man-

al operation of the machine.

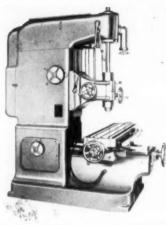
The Hydra-Drill is claimed to be adaptble to most, or all, Atlas, Boice-Crane, luffalo, Canedy-Otto, Craftsman, Delta, nd Walker-Turner drill presses. Com-



dete information of the unit's adaptbility will be sent upon request to: The General Pacific Corp., Dept. BB 1501 E. Washington St. Los Angeles 21, Calif.

HIGH CAPACITY VERTICAL MILLING AND BORING MACHINE

new combination vertical milling nd precision boring machine, model No. has recently been introduced by W. . Knight Machinery Co. Incorporating several new features, the No. 50 has unusual capacity, it is said. The unit is de-



signed to simplify operation, although it is adaptable to an extreme range of work. In addition, it is claimed to offer exceptional speeds and power for rapid metal removal.

The entire base is a rugged one-piece semi-steel casting, designed to provide the rigidity required for precision work. For machine shops doing a variety of work, the new Knight machine offers the advantages of an accurate solid-base boring machine and rigid vertical milling machine without the necessity of securing both types of equipment. An illustrated catalog page giving complete information will be sent upon request to:

W. B. Knight Mach'y. Co., Dept. BB 3920 W. Pine Blvd. St. Louis 8, Mo.



VARIABLE SPEED TRANSMISSION

For "A" section V-belts __ 3.3 __ 1 speed range_perfect belt alignment in all positions. Priced so low that no shop or machine need go withoutinfinite speed selec \$16.50

(3 Types-8 sizes to choose from)

Standard Transmission Equipment Co. 3409 VERDUGO ROAD

LOS ANGELES. CALIF.



Pictured: a 38-Spindle Heavy-Duty
Drill Head.

DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILLING EQUIPMENT

We invite your inquiry.

MICHIGAN DRILL HEAD CO.

M. Control of the con

Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

- Adjustable Reel to fit various sizes of coil.
- 2. Reel is adjustable to suit height of Press.
- 3. Reel can be inclined to any position.
 PRICE \$55.00 F.O.B. BROOKLYN, N. Y.
 Manufactured By

John Humm Safety Equipment Co. 253 SHEFFIELD AVENUE BROOKLYN 7, N. Y.

Speed Reducer EFFICIENCY



I/50 to 2 h.p. .005 to 1 h.p. EFFICIENCY in speed reducers today means precision for accuracy, long-lived construction for dependability—low maintenance cost—qualities that distinguish the Abart line.

About SPEED REDUCERS

Spur, Worm, and Combinations in over 75 types and sizes, from 1/50 to 417 h.p. Ratios from 2:1 to 10,000:1.

New Abart Bulletins on duties you require. Full information with Valuable Engineering data.

ABART GEARS: Cut to your specifications of any gear material. No stocks.

ABART GEAR & MACHINE CO.

ABART GEAR & MACHINE CO.
4832 W. 16th St. Chicago 50, III.

Micero
Jupreme
LAY-OUT AND
IDENTIFICATION DY

For Tool, Die, Pattern er Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . Write for circular.

*Pupis shipped wises otherwise specified.

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.

NEW 12-SPEED SIDNEY GAP LATHE

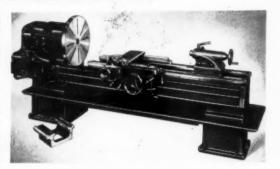
To the right is the new Sidney Gap Lathe, being manufactured by the Sidney Machine Tool Co. This unit made its first appearance at the recent Machine Tool Show in Chicago.

The lathe is obtainable in 14", 16", 18" and 20" sizes, and features a 12-speed sliding spur tooth geared headstock. Automatic lubrication is provided by a rotary pump and filter. The gear box provides 48 changes of feeds and threads. The closed exterior design of

the gear box is to prevent dirt and chips from entering the working parts of the

lathe.

The apron is of double-wall construction, with all shafts rotating on antifriction bearings. A built-in oil pump and filter provide lubrication to all apron bearings and gears as well as to the bed ways and cross slide. The bed is constructed with four longitudinal walls and



double cross girts spaced at 12" intervals. Complete specifications on this new gap lathe are available upon request to:

The Sidney Machine Tool Co., Dept. BB, Sidney, Ohio NEW 360 CYCLE M-G SETS

Burke Electric Co. has added 360 cycle units to its line of 180 cycle generators. The new units are standardized in ratings of 6.25, 12.5, 25, and 62.5 KVA. The oper-

THE BERKELEY POWER DRIVE



For over twenty years the drive to better and greater production.

One of several types of adaptations of a BERKELEY drive to a Radial Drill Press.

Manufactured exclusively by

THE DANVILLE TOOL CORPORATION DANVILLE, ILLINOIS

ation of two or more sets in parallel is recommended for adequate power under various conditions of operation and rates of production without operating a large set for a small block of power.

The generators are designed for an inherent voltage regulation of 8%, maximum, which is not affected by variations in the primary voltage. It is possible to adjust the high-cycle voltage by a rheostat to compensate for line drop.



The 60-360-cycle sets are driven by the new Burke "Series D" streamlined squirrel-cage induction motors. Standard induction-motor-driven sets are designed for operation at 3600 RPM with 220/440 or 550 volts, 2 or 3 phase, input; and 230 volt, 3-pnase output, for operation at 80% power factor. These sets will deliver full load continuously without exceding 40° C rise when operated at rated voltage and power factor.

Sets are also available with D-C motor drive. For complete information, write:

The Burke Electric Co., Dept. BB 1845 W. 12th St., Erie, Pa.

METAL REINFORCED WOOD MAUL

The use of a cross-bolted aluminum alloy eye to join the head and handle is a construction feature which saves the cost of frequent replacement of mallets; this is incorporated into the new Metalocked Wood Maul, a product of the Safety First Supply Co. The cross-bolting holds the head rigid, prevents it from shifting, and reduces the danger of the head flying off while in use.

Since the reinforced head is wooden, the maul can be used for striking machinery or metal where steel mallets would cause damage. The maul is available in three sizes. Model A, 36" long, head 11½"x23¾", weight 6½ lbs, is designed for heavier work. Model B, 18" long, head 7"x1¼", weight 1¾ lbs, and Model C, 17½" long, head 6½x1¼", weight

SYNTRON

DEPENDABLE

ELECTRIC HAMMERS



Will Drill - Cut and Chip Concrete and Masonry IN 1/10th THE TIME

it takes you to do the same jobs with a hand hammer and drill. Their 3600 blows per minute from the ordinary 110 volt light socket speed up the job.

Write for illustrated folder.

SYNTRON CO. 300 Lexington, Homer City, Pa.



CHOOSE THE GRADE OF HYPREZ DIAMOND COMPOUND

FROM 23 ENGINEERED STANDARDS

Exactly Suited For Your Job Of

LAPPING and POLISHING



Complete range of color-identified fine to coarse grades.

Fastest stock removal to perfect finish on Steel, Tungsten-carbides, Stellite, Sapphire and other hard materials.

Available in sealed cartridges for use with Hyprez Applicator Gun.

Ask for free demonstration. Our engineers and representatives are at your service.

HYPREZ DIVISION
ENGIS EQUIPMENT COMPANY
431 So. Dearborn St., Chicago 5, III., U.S.A.

1½ lbs, are designed for use in machine shops, foundries, sheet metal shops, on jobs where striking machinery casings, equipment, sheet metal casings is necessary. For further information write:

Safety First Supply Co., Dept. BB, 530 Fernando St., Pittsburgh 19, Pa.

NEW SIGHT FEED ACETYLENE

A redesigned and improved series of Carbide Acetylene Generators, featuring lighter weight and greater portability and safety is being manufactured by the Sight Feed Generator Co. The visible supply hopper is now constructed of steel stampings, which reduces the overall weight, and makes possible faster recharging. By the use of new pneumatic rubber tired trucks, the generator may be moved about the plant with greater ease.



The Model PS, illustrated, bears the UL and FM stamp of approval; a further measure has been provided by the addition of the Sight Safety Check which is claimed to stop all flashbacks derived from improper operation of the torch. This series is available in four sizes: the 6-PS, providing 30 cu. ft. per charge; the 12-PS, 60 cu. ft.; the 25-PS, 125 cu. ft.; and the 50-PS, with 250 cu. ft. per charge. Complete literature is now available from:

The Sight Feed Generator Co., Dept BB Richmond, Indiana



SWITCH



Complete with motor . . . 4" four-jaw universal machine tool chuck and foot control switch. Capacity from ½" to 1½" reamers. Four speeds . . . 30—45—72 and 115 RPM. Higher speed ranges available. Eliminates handwork. Speeds production. Mail your or-der today. The new Greaves streamlined reamer-driver will come your way - pronto!



SPRING-AIR PRESS

A compressed air operated press to re-place the Kick press featuring

- Adjustable Blow 0 to 5.000 lbs.
- Controllable Speed Push Stroke 500 lbs.
- Two Handed Safety Release
- Speed 100 Strokes
 Min
- Adjustable Throat Height
- · Adjustable Stroke With Positive Stop

Write for bulletin

Exclusive Territories open

Prompt deliveries

WINTER PRODUCTS INC.

189 State St.

Bridgeport 3, Conn.

Monarch Precision SHAPLANE Radius Tools



Patent Pending

For Lathes, Shapers, Planers, Boring Mills, etc. Min. Rad. 1/2" to Max. Rad. 21/2". Made in 3 Models.

C. B. TEETER **Machine Specialties**

4470 Oakenwald Ave., Chicago 15, III. Phone Drexel 3571



STANDARD D-4 Abrasive Band Grinder

> Famous for Stamina

This new, streamlined beach type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x3614" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING-WRITE TODAY

S SALES (38th St., New York 16, N.

25" LOBLOND HEAVY DUTY ENGINE LATHE

The new 25" LeBlond Heavy Duty Engine Lathe is the first engine lathe of this size to be built with a totally enclosed, automatically lubricated quick change box.

In addition to the enclosed quick change box, the new LeBlond 25" offers 16-speed geared heads tock with high speed gears hardened and ground, one-piece apron with positive jaw feed clutch and one-shot lubrication, thrust-lock tailstock with exclusive Le-

stock with exclusive Le-Blond worm and rack construction, flame hardened and ground steel bed ways front and rear, and many others.

The quick change box is sealed in an oil-tight casting, and is lubricated automatically, requiring no operator attention. It has steel gears throughout; sliding gears are mounted on splined shafts, and quadrant gear is mounted on anti-



friction bearings. Forty-eight feeds and threads may be set quickly from the direct reading plate fitted on box. An additional lever is provided for engaging and disengaging the leadscrew.

For descriptive literature, send for

Bulletin HD-151 to: The R. K. LeBlond Machine Tool Co., Dept. BB., Cincinnati 8, Ohio

CUTTING RANGE FROM FIBRE TO STAINLESS STEEL EMBRACED BY NEW DI-ACRO NOTCHER

The Di-Acro Notcher, a new product of the O'Neil-Irwin Manufacturing Co., is a rugged, precision shearing unit which is reported to be able to cut notches in sheet materials rapidly and accurately, eliminating the need of dies for this specialized application. A 90° notch of any size, within the capacity of the ma-



chine can be cut in one operation either at the corner, or in any position along the edge of a sheet. It is also possible to shear angles both smaller and greater than 90°.

A flexible gaging device built into the unit allows a notch of any dimensions desired to be exactly located, providing precision in all duplicated parts. The action of the Di-Acro Notcher is obtained through a roller bearing cam which evenly distributes the shearing pressure on both shear blades.

The construction of the notcher and its triangular shaped ram which controls the position of the shear blades assures a clean cut which is free from rough edges or burrs even in the heaviest materials within its capacity, according to the manufacturers. The cutting range extends from plastics, fibre, and rubber to heavy gauge aluminum, cobalt steel, chrome molybdenum, and stainless steel.

Complete specifications on the Di-Acro Notcher are contained in a 40-page catalog, available upon request to:

The O'Neil-Irwin Manufacturing Co. Dept. BB, Lake City, Minn.

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected - save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON 429 Kent Ave... Brooklyn, N. Y. Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes. invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. - Inexpensivelast for years.

Write for Circular NIELSEN TOOL & DIE COMPANY 1962 W. Eleven Mile Road, Berkley, Mich.



NEW TYPE

3 FLUTE

2 For Hogging 4 for Finish

Three Flute does both.

Send For Catalog Jobber inquiries invited.

Cadillac Cutter Co. Grand Ropids



Joseph B. Fakes & Co., Royal Oak, Mich.

If you use COOLANTS INVESTIGATE The New Coolant Additive



8 S. Michigan Ave., Chicago 3, Ill.

New Ball Bearing Live Center Designed for maximum strength and rigidity, the Ball Bearing Live Center is

recommended for high speeds, heavy

roughing cuts, etc. 60

degree point runs in substantial precision ball bearing which is easily replaceable.

Center with No. 2 taper shank - \$11.50 With No. 3 shank \$13.50

426 E. Madison St South Bend 22, ind

MUMMERT-DIXON SWING FRAME GRINDERS



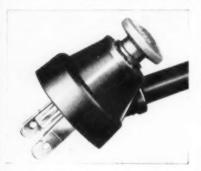
- Standard sizes for 24", 20", 16", 14" and 12" wheels.
 For high speed wheels at 9,000 to 10,000 sfpm, or vitri-fied wheels at 5600 to 6000 sfpm.
- · V-Belt Driven Two speeds.
- · Convenient speed change. · No balancing weights required.

Write for Bulletin No. 3

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

THE NEOLOCK LOCKING PLUG

A new locking plug which fits any standard outlet has been announced by Neoline Inc. This new accessory, designated as the Neolock "105" Locking Plug,



requires no special receptacie or attachment. Slight finger-tip pressure on a plunger attached to a sliding wedge forces the prongs of the plug tightly against the contacts of the receptacle, locking the plug securely, and forming a positive contact even in a badly worn

receptacle. It is unlocked simply by pulling out the plunger. Only one action is needed for inserting and locking, or unlocking and removing the plug.

The Neolock has been field tested in many different industries. It has been found useful when used with electrical equipment and tools in shops and factories, and with fans, radios, electric clocks, and other electrical appliances where accidental removal of the plug from the outlet would cause inconvenience. The manufacturer claims that the plug is highly practical for factory installation on electrical products, and because it is easily assembled and disassembled, it may be quickly substituted for the former type of plug on appliances now in use.

The Neolock is approved by the Underwriters' Laboratories, and is designed with no exposed metal parts. The unit is made of Meoprene, an oil and sun resistant, crack and crush proof, rubber composition that withstands rigid weather and abuse tests. Complete information may be secured from:

Neoline, Inc., Dept. BB 130 So. Hewitt St., Los Angeles 12, Calif.

The Lyon INTERNAL GROOVING TOOL

Its versatility saves costly preparation time — provides precision grooving of single or multiple grooves at a production rate — plus economy of set-up time — and low initial cost. The LYON has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

By changing only bushings and cutters within the tool model range, you have at your command a wide variety of bore sizes and shapes. A simple adjustment regulates location and depth of groove. Work cannot be scratched or marred because the head of the tool does not turn when the cutter operates.

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.



GROOVE LOCATED FROM BOTTOM OF HOLE



SINGLE GROOVE LOCATED FROM

YON MACHINE CO., WORCESTER 3, MASS.

STANDARD PARTS



FOR
JIGS, FIXTURES.
DIES, GAGES, TOOLS
AND MACHINERY

Featuring
Hand Knobs, Quarter Turn Screws,
Spherical Washers,
"C" Washers "C" Washers, Jig Write for Catalog No. 2 Inquiries for Tool Die Invited

GEORGE F. BUB AND SON



DRILL JIG BUSHINGS A.S.A. STANDARD

on standard sizes Fost service on specials

(Write for Catalog and Discount Sheet)

WEST COAST AERO TOOL CO. 5401 Fountain Ave., Los Angeles 27, Calif.

iah Speed Cutting Tools

- Special high speed circular, devetall, fiat form and special tool bits.
- and special tool bits.

 Design and manufacture of small machines, jigs, gages and experimental parts.

 Regrinding and salvaging high speed flat form, special bits and small flat broaches. DELIVERY AS REQUIRED

WRITE FOR QUOTES

Attractive Proposition for Representatives

Lincoln Park Manufacturing Co. 3302 Dix Road Lincoln Park, Mich.

ATLANTI for GEARS

Our service on small gears, due to new equipment recently installed, will interest you.

Send samples OI blueprints for quototion.

NTIC GEAR WORKS, INC 192 Lafayette St., N. Y. 12, N. Y. CAnal 6-1441

THE SIMPLIFIED ODTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO 109-105 Lafayette St., New York, N. Y.

· CARROLL · · · IVIDING HEADS



3 SIZES - 4 MODELS - 6" to 12" TROYKE MFG. CO. 4422 APPLETON ST. CINCINNATI 9, 0.

CLOSED

Plain Type

TRADE < AUTOM



CLOSED MARK

Offset Type

ONTINUOUS

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.

1110 E. 87TH ST. CHICAGO 19, ILL.

SPECIFICATIONS: Open Width % to 6' Gage Material .040 to .125 Pin Diameter .101 to % Lengths to 120'

SEMI-OFFSET

NEW GREAVES MILLER STRESSES SIMPLICITY OF OPERATION

A rugged, full-powered No. 2 Heavy Milling Machine of simple design, with several desirable features, is announced by Greaves Machine Tool Co., manufacturers of machine tools and gears. This unit is a basic type miller, stressing simplicity of construction and operation.

Among the outstanding features included, is the fact that all shafts in the spindle gear train roll on anti-friction bearings. Gears are hardened and lapped: both spindle and feed type gears run in oil. The machine is equipped with a Timken bearing spindle. The spindle speeds cover a range of from 20 to 1000 rpm. The table feeds are from ½" to 20" per minute. Equipment includes a rapid traverse in all directions, actuated by a foot pedal. Both table and saddle slides and screws have one-shot lubrication.

The Greaves No. 2 Miller is equipped with either round or rectangular overarm support. The unit is powered with a 5 HP motor through triple Vee belts.

Complete information is contained in



a descriptive bulletin, available upon request to:

Greaves Machine Tool Co., Dept. BB 2001 Eastern Ave., Cincinnati 2. Ohio

"BUHRMATIC" DOUBLE END DRILLER

The "Buhrmatic" is a fully automatic double-end driller for the production drilling of crossed holes. It is a recent development of the Buhr Machine Tool Co. The machine is hopper fed; it drills, reams, countersinks, and checks at the desired angles by indexing the collets in an indexing turret, providing eight work stations and a loading and unloading station.

The unit can be operated in batteries

of four by one operator; the parts are loaded in one "bulk" handling, and are ejected automatically. Safety devices have been incorporated into the unit to halt the machine cycle in order to prevent damage from broken tools, or other impediments to the work process.

Complete details and specifications on the "Buhrmatic" are available upon request to:

Buhr Machine Tool Co., Dept. BB

Let Us Finish Your Grief Jobs

We Have Complete Facilities For Any Type of Machine or Hand Lapping

Specialists in Lapping of Extreme Close Tolerance Precision Parts also Fancy Honing & Grinding Service

TOLERANCES HELD TO 10 MILLIONTHS!

Diesel Injectors, Cylindrical Fits, Small Holes, I. D., O. D., Flats, Carbides, Balls, Flash Chrome Salvage of Rings & Plugs, Fancy Reamers.

Finishes to 1 Microinch

SIMPLEX GAUGE & LAPPING CO.

20745 Giendale

KEnwood 2-0112

Detroit 23, Michigan

GEM VISES



J. E. MARTIN MACHINE WORKS SPRINGFIELD, OHIO

ISOMETRIC SKETCHES ARE



EASY TO MAKE AND READ !



3 - W A Y REICH PRECISION TEST INDICATOR

Lifetime conical bearings, stainless and nonmagnetic. Sturdy construction, no returning for adjustment or service. .014" reading. Price \$6.50. Write for folder.

J. R. Reich Manufacturing Co.

OW NESTING TYPE

20" Long x 12" Wide x 61/4" Deep 16 Ga., drag holes, handles both ends.

L. LUCAS & SON, INC. BRIDGEPORT 5. CONN.

VELSEY GRANITE SURFACE PLATES

IMMEDIATE DELIVERY ON STOCK PLATES OTHER SIZES ON REQUEST

10 YEAR WARRANTEE

THE ELKRO CO. DAYTON 6, OHIO 181 SALEM AVE ..

TANKA BANGSA PARABANSA KANDU KANDA BANGSA Save Space and Lifting

Yohe Racks take less floor space— hold more stock and require less lifting. Four arm rack, 51" high stacks, 10,000 lbs. Five arm rack 57" high holds 12,000 lbs. flat or round stock—at safe lifting heights. Use against wall or back-to-back in center of room.

Let us send details and prices.

WM. S. YOHE SUPPLY CO. 508 Mahoning Rd., N.E. Canton, Ohio

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

BLOOMFIELD TOOL CORP.

36 Farrand St.

Bloomfield, N. J.

PROMPT DELIVERY UP TO 12" DIAM. - 3 D. P. CUTTING ONLY or COMPLETE GEARS

EST GLEASON EQUIPMENT Teaces MACHINE TOOL CO. BG 2013 Eastern Ave.

Cincinnati, Ohio



FORM ST. LOUIS FOUNDRY

Formation of a new St. Louis foundry, the Mullins Non-Ferrous Castings Corporation, 1800 South Eighteenth street, has been completed and the new company is now in production, it has been announced by Fristoe Mullins, president of the concern. The company is capitalized at \$50,000.

The Mullins firm manufactures castings of aluminum, copper, brass, bronze and like materials, ranging in weight from one ounce to 400 pounds. Capacity of the plant is 10,000 pounds of aluminum, or 25,000 pounds of brass daily.

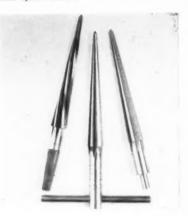
The new concern purchased the property and complete foundry of the Acme Brass Foundry, which had been completely fitted with modern equipment in the past two years. The main plant building has an area of 5000 square feet and a subsidary plant covers 2500 square feet.

DANIELS HIGH SPEED REAMERS

A new line of hand and center reamers is being introduced by the N. J. Daniels Tool Co., manufacturers of carbon and high speed tools. These tools are precision made, of the highest quality tool steel; the manufacturers claim that the workmanship entering into the making of these tools is expertly controlled in each successive step.

The Daniels Hand Reamers with straight flutes, for increasing the diameter of holes in metal or wood, have a length of from 3" to 14". The entering diameter sizes range from \(^1\sigma^{2}\) up to 2"; these are in increments of 1/64" up to 3\(^1\sigma^{2}\); increments of 1/32" up to 1"; from 1" to 2" diameter, the sizes increase by 1/16" increments. The reamers are available in either carbon or high speed steel, heat

treated, and have a flute length of from $1\frac{1}{2}$ " to 7"; depending upon the overall length. A similar type is also available with spiral flutes.



A further series are the Daniels Chucking Reamers, in four types; with straight flutes and taper shanks; straight flutes and straight shanks; spiral fultes with straight shanks; and spiral flutes with taper shanks.

These reamers are obtainable in sets, packed in wooden cases. They also come individually packed in transparaent plastic tubes, providing ample protection, yet allowing the selection of type and size without the necessity of unwrapping or handling the tool itself. Complete information will be supplied upon request to:

N. J. Daniels Tool Co., Dept. BB 67-71 Washington St., Haverhill, Mass.



SERVING INDUSTRY FOR 34 YEARS
Cools hot bearings • Solves toughts
lubricating problems • Saves wear on
moving parts • Works wonders with
cutting oils • Packed in 5-10-25-50-100
lb, containers. Write for Free Sample.

SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. Chicago 13, III.



ERRINGTON MECHANICAL LABORATORY STAPLETON, STATEN ISLAND 4, N. Y.

6701 N. SIOUX AVE., CHICAGO



Fully Enclosed to Insure Pressure Lubrication and Rigid Support of Adjustable Spindles



HEADS

Severance

TUBING CUTTER GROUP - FOR FAST DEBURRING OF EVERY

TUBE DEBURRING CUTTERS (Standard)



18 Standards in H.S.S. and Cemented Carbide _--

ADJUSTABLE TYPE



Adjustable from 1/2" -2-1/2" O.D. -- for short runs TUBE CHAMFERING MILLS



23 sizes from 3/16" - 2-1/2" O.D. — Chatterless

SOLID TUBE DEBURRING CUTTERS



16 sizes from 1/4" - 1-5/8" O.D. - H.S.S. and Carbide

From light hand-deburring up to close tolerance deburring, chamfering, flaring . . . For working non-ferrous metal, steel (including stainless) and plastic tubing . . For combining reaming, sixing or floring with end facing and deburring . . . Whatever the operation or material, Severance HSS and Cemented Carbide Tube Deburring Cutters are TOPS in performance - long life - economy.

SPECIAL TUBING CUTTERS







COMPLETE REGRINDING SERVICE BY NEW TOOL CRAFTSMEN SAVES YOU MONEY!

SEVERANCE TOOL INDUSTRIES

SAGINAW. . MICHIGAN



TOOL OF 1000 USES

Speed with power with precision, PRECISE 40, the fastest, most powerful electric handtool made, weighs only 40 oz. Built for production. Mills, grinds, polishes, deburrs any material from filehard steel to bronze, plastics, wood or rubber. Imagine, with tungsten carbide cutters PRECISE 40 mills the hardest steel!

PRECISE 40 in cool, shockproof, plastic case operates on AC-DC. Use it as a handtool or as a motorized quill in vise, lathe, mill or on your produc-

Write

FOR CIRCULAR

tion set-up. Many accessories and rotary tools available. Also COOLFLEX Flexible Shaft attachment with 9-oz. air-cooled handpiece.

ENGRAVES

SHARPENS

PRECISE PRODUCTS CO., 1331 CLARK ST., RACINE, WIS. U.S.A.

HE NEW PRECISE 40

SCIENTISTS PROBE ELUSIVE CAUSE OF 'INDUSTRIAL CANCER'

Paralleling medical science's campaign to solve the stubborn cancer problem, metallurgists of SKF Industries, Inc., (Front St. & Erie Ave., Philadelphia 32) are now concentrating on a drive to eradicate a type of "industrial cancer" that is currently costing U. S. industry unnumbered millions of dollars each year.

A team of industrial scientists headed by H. O. Walp, SKF metallurgist, is studying the unusual and baffling reactions in the crystals of steel which beGRINDS MILLS

DEBURRS

DRILLS

FINISHES

POLISHES

and day over several years.

come "tired" due to stress "irritations," cause ob-jects like automo-bile axles, ball and roller bearings and other machine parts to crack and fail.

"Just as cancer originating in the body cells is one of the principal causes of human death, the breaking up of the basic crystals or 'cells' of hard metals accounts for more failures in modern engineering practice than any other single factor," says Walp, who has devoted 26 vears to research into the causes of metal failures.

In their efforts to track down the cause of this "fatigue phenome-non," Walp and his associates are currently concentrating on the extremely hard steel used in the manufacture of high-precision bearings for machinery of all types. They use a battery of 27 testing machines on which they whirl dozens of anti-friction bearings at varying speeds for test runs which sometimes extend night

"Steel, like all metals, is crystalline." In heat-treated parts of bearings, crystals are small. "The cohesive forces which hold material together are stronger toward the interior of such crystals than they are across the areas where one crystal meets another. Since the crystals are irregularly shaped, it seems, for instance, reasonable to conceive points in steel where two, three or more crystals meet and where the cohesive forces would, therefore, be particularly weak and subject to cracking or breaking under prolonged strain."



SERVICE WITH Aunch/

Allied's 48-page R-B catalog contains complete data and prices on R-B Interchangeable Punches and Dies — recognized and used for accurate, trouble-free punching throughout the metal-working and plastics industries. But that is only part of the R-B story. Also included in this catalog is full information on Allied's "one stop service" which includes retainers, com-

posite die sections, rubber strippers, guide pins and bushings, and miscellaneous die makers' supplies. A copy is available to you without charge or obligation. Write for it today.



RICHARD

ALLIED PRODUCTS CORPORATION

Department 23 . 4644 Lawton Ave. . Detroit 8, Michigan



CIRCLE
CUTTING
ATTACHMENT
included_as
STANDARD
EQUIPMENT
with this
machine

LIBERT MACHINE CO. GREEN BAY . WISCONSIN

for BETTER PRODUCTION and MAINTENANCE at lower cost

A proved time-saver in any sized shop; Libert's flexibility gives you a wider variety of work—clean shearing of flat or formed sheet metal...straight or irregular shapes...inside or outside cuts. Libert simplicity means that even unskilled labor soon does accurate work, lots of it and fast!

Write for bulletin.

Made In sizes up to 60 In. throat, 10 gauge capacity

Libert Hi-Speed SHEAR

ANNOUNCING

New Erickson-State **Boring & Reaming Tool**

Erickson adds precision methods to the manufacture of these proven. widely known production tools. The patented State 4-cutter principle permits heavier feeds at higher speeds and delivers more pieces per grind than single-point or double-cutter tools. More regrinds; less adjusting time; accurate, clean holes. Sizes for range of 1 1/16" to 5 1/2".

Also, the Erickson-State adjustable core drill for heavy duty applications involving excessive chip problems. A heavy hogging, chatterless replacement for fixed core drills. Fast operation and accurate, uniform results realize a new low cost per hole. Sizes for range of 11%" to 516".



Write for our catalog.

Learn how these two companion Erickson-State tools can cut costs for you. They can be adapted to many special requirements up to 51/2" boring diameter. We shall be

Ask for our Bulletin "R-1"

Made by

ERICKSON TOOLS DIVISION 2310 Hamilton Ave. Cleveland 14. O.

NEW ALUMINUM EXTRUSION PRICING POLICY ANNOUNCED BY REYNOLDS

Announcement of an entirely new system of pricing aluminum extruded shapes has been announced by R. S. Reynolds, President of the Reynolds Metals Company. This system, described as a complete departure from the "factor" pricing method generally used throughout the industry, is heralded as promoting price reductions on heavier aluminum extruded shapes weighing .250 pound per foot and up. These price changes may amount to as much as 4 or 5 cents a

pound or a per centage decrease of approximately 8 to "We 10 per cent. "We believe", said Mr. Reynolds, "that this new pricing arrangement will eliminate many of the inequities of the old factor system.

"The factor system follows a formula that divides the weight per lineal foot of the individual shape into the perimeters of that shape to give a factor which determines the price range. The Reynolds price formula evolves around two prime factors: weight per lineal foot and intricacy of the shape. This pricing method is based on cost of production and does not, therefore, penalize the more simply designed shapes, and, actually 'individualizes' each price quota-

Reynolds also announced that die charges for solidshape extrusion dies and for rod and bar extrusion dies would be absorbed by Reynolds after certain mini-

mum shipments of metal are made from such dies.

As an indication of the price reductions possible. Mr. Reynolds gave examples of how this system will operate to the benefit of users. "On a certain extruded shape weighing 3.682 pounds per foot, the previous price was 45.7 cents a pound under the factor method of price computation. Now, our price on this same shape will cost only 41 cents a pound. A particular shape that was quoted at 59.5 cents per pound, now carries a price classification of only 54 cents a pound.

Unskilled labor does PRECISION RIVETING

With a Weber Automatic Staking Machine, unskilled operators turn out more kinds of jobs faster and more accurately than any other method. Simple adjustment delivers the right hammer blow for each job whether staking fixed or movable joints. Write for folder.

	Model 1	Model 1-B	Model 2
Stroke	2"	2"	21/2"
Spindle	1"	1.	11/4"
Phroat Spindle	434"	43.6**	914*

ADJUSTABLE

HOLLOW MILLS



DISTRIBUTORS

Some territories are still open, offering substantial profit pos-Write sibilities. garding yours.



with locking device to assure absolute Kutmore Hollow-Mills may be had with straight or taper shanks, high

speed or Carbide Tipped blades. Insist on Kutmore for accuracy. speed and economy.

Prompt delivery. Write for Catalog No. 15.



Perforated Metals



REMEMBER—for screening, guarding, ventilating, etc., **Perforated Metals** are stronger, dependably accurate longer and insure longrange economy.



REMEMBER also—that H & K offers you 65 years accumulated experience in precision perforating of metals, as well as plywoods, plastics, fabrikoids and other materials. H & K, too, offers you a wide selection of sizes, shapes and spacings. Send your specifications NOW for complete information.

Don't Forget—H&K "Make Your Own" Safety Guards . . . strong, safe, inexpensive. Ask about them!

Harrington & King

5635 Fillmore St., Chicago 44, III. • 114 Liberty St., New York 6, N. Y.

REPORT DISABLED VETERANS PERFORM JOBS EFFICIENTLY

Disabled veterans, training under Public Law 16 for positions they can fill, have proved more efficient than their able bodied fellow-trainees, according to the opinions of a number of employers.

A large eastern railroad wrote that a former machinist apprentice, who lost his right hand in action, was given the opportunity to continue his apprenticeship and "proved...that he has the makings of a good machinist despite his handicap."

A half dozen Wisconsin firms, with a combined total of 355 years' experience in training disabled workers, reported that their handicapped veterantainees generally are performing as well as trainees without handicaps.

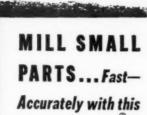
The firms-Allis Chalmers Mfg. Co., International Har-vester Corp., Nordberg Mfg. Co., Falk Corp., Cutler-Ham-mer Corp., and Milprint, Inc. placed their more seriously disabled veterans in drafting rooms, engineering departments, inspection departments, laboratories, and other units in which a worker's disability will have no effect on his output.

The manager of a Seattle, Wash, machine shop informed Veterans Administration (Washington 25, D. C.) that he found disabled veterans show more progress on the job than men without disabilities

A survey, conducted by the Federal Security Ag-

ency of the U. S. Office of Vocational Rehabilitation, revealed that: Handicapped workers had a lower absentee rate than the able bodied; they remained at their jobs longer than the able bodied; their efficiency was slightly higher than that of the able bodied; and they had better safety records than the able bodied.

Veterans are eligible for training under Public Law 16 if they require such training to restore their employability. While training, a veteran receives a subsistence allowance plus his disability compensation.



NEW
Rouse
HAND
MILLER



\$98 (Without Fixtures) F.O.B. Chicago, Motor Extra

Rouse Fixture Set-Ups that Speed Pro-

duction.







It's a high-speed, motordriven unit that has many uses in finishing operations for light cuts on aluminum, brass, steel and other metals . . . also, rounding and burring steel and cast iron. Inexperienced operators quickly learn to use it with speed and precision.

The Rouse Hand Miller, with Rouse Fixture Set-Ups, provides fast, accurate, low-cost milling for a big variety of small parts used in electrical work, instru-

ments, aviation, communications and similar work.

Available for immediate shipment. Write for illustrated circular and full details.

H. B. ROUSE AND COMPANY

2216 N. Wayne Ave. Chicago 14, III.

FOR Jaster PRECISION FITTING



of Gears, valves, cylinders, bushings, bearings, etc.

Timesaver Lapping Compound is a powdered abrasive prepared especially for applications where fine lapping, perfect control and freedom from embedment (charging) are imperative.

Check these features:

- · Absolutely non-imbedding
- Diminishing (self reducing) ac-
- · Becomes totally inert thru use
- Laps all metals from soft babbitt to hardened steel
- 28 years of successful use

Write for samples and literature

TIMESAVER PRODUCTS CO.

739 W. Monroe St.

Chicago 6, III.



A Lovejoy Type "F" Slotting Cutter with Tungsten Carbide-tipped blades used for milling slots in forged steel connecting links produced the amazing results that follow:

Workpiece: Connecting link used in mining machinery (see insert)

- Material: SAE 3145 Forging - Hardness: 190-200 BHN

Operation: Mill slot 115/15" wide x 2 1/4" deep*

*Milled in one pass from solid metal section

Cutter: Lovejoy Type "F", T.C.T. Slotting Cutter 10" diameter

Speed: 117 r.p.m. (306 SFM)

Feed: 7.75 r.p.m. (.0065" per tooth)

Rate of Metal Removal: 21.8 cu. in. per minute

Finish: Excellent (no further finishing operations required)

A full description of this outstanding production tool is contained in the new Lovejoy Catalog No. 28. Write for it today.



OFFERS PLAN FOR RESTORING ORDER IN EUROPE THROUGH GERMANY

Lewis H. Brown, Chairman of the Board, Johns-Manville Corp., said today that nothing can be accomplished in either Germany or Western Europe under the Marshall Plan, unless the United States puts into effect "an entirely new policy for the revival of Germany."

Mr. Brown recommend the following policy: we must set up an organization to deal with this problem; we must give new hope to Germany and western Europe; we must use food in order to force the production of coal in both Germany and Great Britain. (i.e., offer additional food rations to workers) and use coal as a dynamic means to get industry going so that with exports they can buy raw materials and food: we must provide in advance for a practical means of repayment if we expect to be repaid.

Once the policy is announced, "The German people will go to work again build a place for themselves in the family of nations in western Europe Once that is done, we will have made the first effective step to stop the spread of communism west of the 'Iron Curtain'."

Mr. Brown does not believe Russia will go to war in the face of such a constructive plan of action. Her policy is to wait hoping" for inaction

Even if all these measures are taken, Germany faces transportation crisis this winter due in part to the fact that already short railroad equipment is tied

up in long hauls of coal from Germany to western European countries. "Before the war, coal was supplied by boat from Great Britain to the large ports of Europe," and Mr. Brown maintains this is one of the biggest contributing factors to the dollar shortage" in Great Britain.

Mr. Brown has returned from an inspection of western Germany. He contends that restoration of the German economy is the only way to relieve the American taxpayer of supporting Germany and western Europe.

"If we fail to integrate our action," Mr. Brown concludes, "Russia's hopes will be realized."

NO BUSHINGS, GUIDES or PILOTS NEEDED

THE READING BROACH KEYSEATER



The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from 1/8 to 3/8 cutter. Prompt delivery—low first cost.

READING MACHINE CO.

READING (CINCINNATI) OHIO



HOLES

SMALL, ACCURATE PRODUCTION DRILLING

AT LESS COST PER HOLE

Hamilton Small Hole, Super-Sensitive Drills have many exclusive, patented features. Your small holes, .004" to 5/16", can be produced by these machines accurately and rapidly . . . and at less cost per hole.

Especially adapted to watch and clock manufacture and to the manufacture of instruments, business machines and other items where finest work must be performed on fast production schedules. These machines have stood the test of time. 80% of present installations are repeat orders.

Machines of various clearances, capacities and travel to fit your specific requirements. Write for bulletin.

THE HAMILTON COMPANY

THESE TICKLISH JOBS were easy . . .

For the Airflex Pneumatic Riveter

A plastic knife handle fastened to knife blade; a leather belt built up from links with long narrow rivets; a ceramic terminal part attached to metal clip with hollow brass rivets—these and other jobs in fragile materials or with long, slender rivets were no problem for the Airflex.



Rolating Impact" successive pneumatic

buted around rivet head by rotating peen.
Only small cross-sectional rivet area receives impact; no stress transmitted to work. Available: Standard or Double-end (to rivet simultaneously both ends of toy wheel axle, etc.) Write for Bulletin 74.

Bench or Pedestal Models
Immediate Engineering Service . . . Immediate Delivery

LEMERT ENGINEERING CO.

WIN THE HOOSTER STATE SINCE 38"

TOOLS 1205 N. Western, Plymouth, Indiana

FORD TRAINS SUPERVISORS FOR EXECUTIVE NEEDS

Supervisory employees of the Ford Motor Company are going to college these days. It's all part of a broad training program to fit them for promotion to top executive positions.

Arrangements were worked out with Wayne University so that in addition to practical on-the-job training, related classroom training would be provided and also the opportunity for the employees to secure a degree in industrial management in the University's School of Busi-

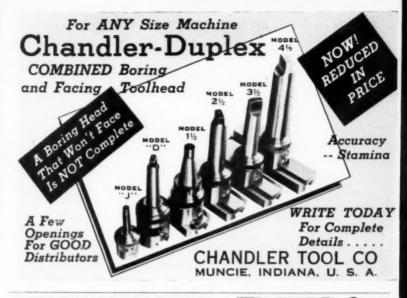
ness Administration.

The program was planned to cover a period of five years, involving various assignments which would give the students basic knowledge of the required skills for manufacturing activity and supplemented by the necessary class-room theory.

Qualifications decided upon were:
(1) an age of 25-35 years (2) applicant must be acting in a supervisory capacity within the Ford Motor Com-(3) trade pany school and apprentice school education, or high school and apprentice school, or high school and two or more years of college (4) demonstrated administrative ability (5) applicants must meet college entrance requirements.

In addition to regular class work and company required courses, the work especially consists of various assignments in supervisory capacities within the manufacturing

areas. The assignments are as follows: one year as assistant to job foreman and assistant to division foreman or supervisor of staff functions; six months in cost control; six months in methods engineeering; three months in scheduling and distribution; three months in scheduling and distribution; three months in quality control; three months in materials control; three months in tool control; six months assistant to general foreman; nine months assistant to superintendent; and six-and-a-half months on specific production problems. A vacation allowance of two-and-a-half months is provided during the five-year program.



DORMAN FRICTION TAPPER with AUTOMATIC REVERSE

Capacity in steel: No. 1 size-2/56 to 36".

You don't need two or three different size tappers to handle a wide range of tapping. Nor do you need to hunt for collets to hold different size taps. By tightening one chuck screw of self centering, full floating chuck jaw the No. 1 will drive the above range of taps.

Attaches to all male spindle drills including Walker-Turner, Atlas, Buffalo Forge, Boice Crane, Canedy-Otto, etc., and to Morse Taper Drill Presses.

Also available in two larger sizes to take tops up to $1\frac{1}{4}$ " in steel or other tapable material.

Round Split, Button or Acorn Die Holder Assemblies in stock for all size Dorman Tappers permitting their use for external threading.

Write for Die Holder Bulletin



DORMAN MACHINE TOOL WORKS 40 S. Mac Questen Parkway, Mount Vernon, N. Y

LINDERME

USERS SAY:

Production UP ...





2 HOLES • 1 STROKE THAT'S SIMPLE ARITHMETIC

with a LINDERME Two Spindle Adjustable Drill Head on the job. Here's a drill head low in price, high in productivity. Its versatility makes it a gold mine. Linderme Drill Head users in general and production machine shops, plastics fabricators and others report great savings from a low initial investment . . . It's quickly set to variable centers from 1/2 to 6", drill capacity up to %", adaptable to various tapping units. Models A and B for sleeve adaptation to drill press quills; Models C and Dwith "over arm" arrangement, mounted on heavy ground base for use with drill fixtures. Write for Bulletin

LINDERME MACHINE AND TOOL CO., INC.

12253 COYLE AVE. . DETROIT 27, MICH.

TREND TO MANAGEMENT-PAID EMPLOYEE INSURANCE SEEN IN PITTSBURGH AREA

The Pittsburgh area reports a broadening trend toward acceptance of the full costs of employee group insurance premiums by management in medium and small steel fabricating companies in this area. One of the most recent conversions to the company-paid premium plan is Oliver Iron and Steel Corporation in Pittsburgh, which has completed the distribution of descriptive booklets to its employees that explain in detail the combination life, sick and accident, surgical

benefits and hospitalization policy on which the company pays all costs.

A report from the Tristate Industrial Association whose membership includes some 67 companies having steelworkers' con-tracts other than basic steel, shows that 13 members report greatly liberalized insurance payments by management as part of the current labor agreement and four companies report full acceptance of insurance costs.

Evidence of a trend toward management assumption of all insurance costs are admittedly still in the minority but the circumstances which have caused these firms to suggest this solution appear to point the way for the future.

It has been a problem for years to obtain the ma-jority of workers required by insurance companies in order to warrant group insurance rates to accept insurance when the worker was required to pay from 40% to 60% of the pre-

mium as earlier plans functioned. Some plants were unable to install insurance plans at all on this basis due to the workers' resistance to this extra expense to their pay envelope despite the benefits offered by the insurance.

Management, consequently, foresees in full assumption of premium costs the means of giving employees a full meas-ure of protective insurance. In effect, the pay-all insurance agreement represents a very real monetary gain for labor and solves a tough management problem in properly protecting employee welfare.

PRECISION LEVELS



FIG. NO. 5 Adjustable type Machinists' Levels with ground and graduated vial. Grooved for use on shafting. Sizes 4", 6", 8", 12", 18".

"MANUFACTURERS OF SPECIAL LEVELS

FIG. NO. 50-For setup and maintenance is accurate to 10 seconds. Graduations are in .0005" per foot. Packed in Instrument Case.

Address Orders or Inquiries to

HALL LEVEL AND MANUFACT

(Established in Geneva, Ohio, in 1913)

1119 E. 4TH

AUSTIN, TEXAS

For EASY Adjustment

Specify

COMPACT DESIGN

HIGH TORQUE

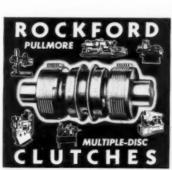
HIGH-RATIO LEVERS

POSITIVE NEUTRAL

PRECISION BUILT

LONG WEAR LIFE

EASY ADJUSTMENT



One-point adjustment, by hand, of ROCKFORD Multiple-Disc CLUTCHES is simple, easy and ample to maintain uniform operating conditions under long, hard usage. Unaffected by centrifugal force, PULLMORE clutches are convenient to operate and are positive in driving, braking and neutral action.

Send for This **Handy Bulletin**

Shows typical installations of ROCKFORD CLUTCHES

and POWER TAKE-OFFS. Contains diagrams of unique applications, Furnishes capacity tables, di-

mensions and complete specifi-

dimore Clutches are sold by Morse Chain Co., affices in principal cities

Here's a worth-while investment Impregnated with carefully se lected diamond grains of uniform size, insuring perfect finish with maximum efficiency, "Secomet'

Here's a worth-while investment. Impregnated with carefully selected diamond grains of uniform size, insuring perfect finish with maximum efficiency, "Secomet" Diamond Wheels remove in the same time and at greatly reduced cost, five to six times the amount of carbides or hard metal that could be removed with a silicon carbide wheel.

Catalog on request.

J. K. SMIT & SONS, INC.

157 Chambers St., New York 7, N. Y. 6400 Tireman Ave., Detroit 4, Mich. 129 Adelaide St. West, Toronto, Ont.

INSTALLATION WILL FEATURE NEW G-E SYSTEM OF HOIST CONTROL

The world's largest overhead crane installation, capable of lifting 500 tons of dead weight at the San Francisco Naval Shipyard, Hunters Point, Calif., features a new system of hoist control developed by General Electric.

The "Maxspeed" system, a recent G-E engineering development, inherently gives high speed with light loads and slow speed when handling heavy loads for either hoisting or lowering operations. Engineers pointed out that this

characteristic is not uncommon in hoisting operations but is new for lowering operations.

G.E. is supplying motors, generators and controls to the Alliance Machine Company of Alliance, Ohio, which designed and built the crane.

The crane runway structure looks like a massive trestle or bridge. It has twin cranes that will operate singly or in tandem atop the runway 207 feet above the ground.

The crane structure is designed to withstand earthquakes and weather extremes. Its 730-foot runway spans a pier 405 feet wide, extending 162 feet over the bay on each side. The cranes have a span of 142 feet, and will operate over the water, where they can lift their hooks through a vertical range of 185 feet.

The two main hooks, or hands, of the cranes each are capable of lifting 245 long tons a hoisting speed of

or 275 short tons at a hoisting speed of 10 feet per minute. Each crane has an auxiliary hook with a capacity of 50 long tons lifted at 30 feet per minute.

When the load is in terms of heavy tonnage, like the huge battleship turrets, the two cranes "join hands" to do the heavy work. The main hooks of the cranes are then coupled to a huge equalizer beam, the size of a freight car, and the cranes operate as one unit. It is then that the "Super-Crane" can lift in the 500-ton class. It will lift a battleship turret as easily as picking up a pebble.

NO. 177 AUTOMATIC GRINDING SIZE CONTROL



Now you can have automatic size and quality control on your cylindrical grinders. Tolerances of .00005 maintained through long and short runs.

Model No. 177 (when grinders are adaptable) will control sizing automatically, eliminating human element.

One operator can run two grinders or one lathe and one grinder. There are many setups possible and practical.

Our engineers will assist you.

FOSTER ENGINEERING COMPANY
4200 WOODWARD AVENUE
ROYAL OAK, MICHIGAN

McGILL'S SOLID CARBIDE DRILLS







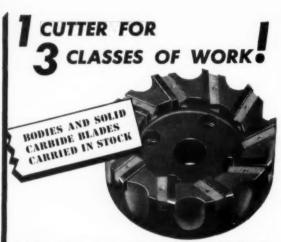
McGill's solid drills last longer, can be operated at higher speeds, cut production costs. Ideal for plastics. Available from stock for immediate delivery. Write for Catalog 107, just off the press. Covers complete line of standard and special tools available with any grade or make of TC metal.

Territories Open

McGILL CARBIDE TOOL CO

4612 Woodward Avenue

Detroit 1. Michigan



Switch to another set of standard solid carbide blades and use this body for any face milling job on any material. Here are features and simplicity tool men like—easy blade interchange, no threads in the body, wedges behind the blades to take the shock and spare the body

Blades properly ground for various classes of work are stocked by Super and ready for immediate shipment See Super Tool Company's Standard Carbide
Tipped Tool Catalog No. 47 It you need a copy, write for one today.

Aluminum! Steel! Cast 7ron!

Dural, Magnesium,
Plastics, Etc.

STANDARD
AND SPECIAL SUPER
Carbide 7001s

SUPER TOOL COMPANY

PLASS MODER IND. DEROIT 12, MICH. - SPIS SAN FERNANDO NO. GLENDALE 2, CAL

CARE: AGENT FOR EUROPEAN NEEDY

CARE, the Cooperative for American Remittances to Europe, Inc., is a service through which Americans can send personal help to friends, relatives and designated groups in Europe. It was originally organized by the 22 major accredited American overseas relief agencies engaged in sending bulk relief to Europe. They were not equipped to handle such a service so they organized CARE.

Standard packages are stock-piled in

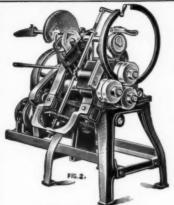
warehouses throughout 15 European countries. Orders received at the New York office are airmailed representatives to in Europe who deliveries make from packages al-ready there. The senders of packages receive two receipts: one when their order is taken and one, signed by the recipient, when their orders are delivered. CARE guarantees delivery or a refund.

According to head quarters, "CARE is a non-profit organization. Surplus resulting from CARE's operations is used for charitable purposes in the countries where CARE operates.

"CARE is government-approved. The Advisory Committee on Foreign Aid, U. S. Department of State, and Department of Agriculture endorse CARE's present campaign. CARE has also been endorsed by President Truman and the governments of countries which have signed agreements."

The organization "guarantees delivery of its packages in the following countries: Austria, Belgium, Bulgaria, Czechoslovakia, Erie (Ireland), Finland, France. Germany, (American, British and French Zones, and all of Berlin), Great Britain. Greece, Hungary, Italy, Netherlands, Poland and Rumania."

To order packages, "Just send \$10 to CARE, 50 Broad Street, New York, for any package you wish to send... If you do not have the name of an individual or group, you may designate a classification of individual help."



No. 14 Angle Rolling Machine

ROLLS ANGLES, TEE IRON, PIPE, FLATS, ROUNDS AND SOUARES CAPACITY-2'x2'x1/4' ANGLE

HERE IS A

Machine

THAT HAS FOUND ITS WAY INTO

40 States

used by Manufacturers of

SHIPS-PLANES-TANKS-AUTOMO-BILES-ENGINES-FURNACES-FARM MACHINES AND METAL PRODUCTS OF ALL KINDS

also by U. S. ARMY — U. S. NAVY UNIVERSITIES

· · · There's a Reason!

EXCELSIOR TOOL & MACHINE CO. EAST ST. LOUIS, ILLINOIS



WILLEY'S TOOLS "Over-the-Counter"

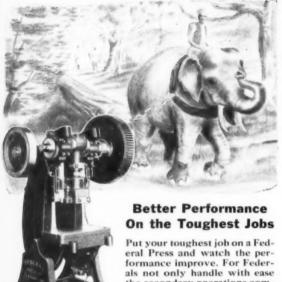
WRITE FOR CATALOG 30 To insure fast service on tungsten carbide tools we have inaugurated an "over-the-counter" service at Detroit and in many other principal cities. From these stocks you can secure

in person or by mail - the complete line of Willey's standard tools and blanks, as well as many tools heretofore considered specials - reamers, face mills, shell end mills, core drills, centers, masonry drills, slotting cutters, gages, wire drawing dies and diamond dressers.

WILLEY'S CARBIDE TOOL CO.

1342 W. Vernor Highway

Detroit 1. Michigan



Available in 8 sizes -- capacity, 6 to 80 tons,

als not only handle with ease the secondary operations common to ordinary presses, but primary and assembly work as well—in some cases perform intricate combinations of all three! Production goes up costs come down! Write for catalog on the Federal line.

THE FEDERAL PRESS CO.

447 Division St., Elkhart, Ind.-Telephone 2831

U. S. CERTIFICATED FLEET DOUBLED SINCE V-J DAY

In the two years since VJ-Day United States certificated airlines operating transports in scheduled domestic and international service have more than doubled their fleet, figures compiled by the Air Transport Association of America show.

The number of planes in operation as of August 15, 1947, totalled 913, a gain of 473 over the 440 aircraft registered with the Civil Aeronautics Administration on the same date in 1945.

Included in the list of new and re-

converted planes placed in operation over the 24-month period are 354 fourengine aircraft. more than with twice the seating and cargo capacity of twin-engine models. bringing the total number of the large transports currently in operation to nearly 18 times that of the figure for August, 1945.

In domestic operations, the postwar scheduled airline fleet has increased 106 per cent. Starting with 181 planes left in service January 1943, after more than half of the commercial fleet had been requisitioned for the military forces lowing Pearl Harbor, the number of planes operated over continental routes had gradu-ally reached 358 by VJ-Day. Today Today there are 738 planes in domestic service.

United States air carriers engaged in in ternational scheduled operations have bolstered their fleet by 113.41 per cent

since August, 1945. On that date 82 planes were in service as compared with 175 two years later. There were only 75 planes in overseas operation in January 1943, after the American carriers had also contributed ships and equipment to the military forces.

Altogether, there are at present seven single-engine, 531 twin-engine and 375 four-engine planes in operation. Of this total, the domestic scheduled airlines account for all of the single, 469 of the double and 262 of the four-engine models. The international carriers have 62 twin-engine and 113 four-engine craft flying to overseas points.

PRECISION ROTARY TABLES



9"-8 97.00

12"- 160.00

15"— 185.00 18"— 220.00

18"— 350.00 Extra Heavy

21"— 500.00 Extra Heavy

25"— 590.00 Extra Heavy Duty

OUR ROTARY TABLE WILL TAKE THE PLACE OF A COSTLY FIXTURE. IT IS USED FOR ALL KINDS OF WORK ON MILLING MACHINES, SHAPERS, DRILL PRESSES AND HORIZONTAL BORING MILLS.

WE CAN ALSO FURNISH DIVIDING ATTACHMENTS.

SEND FOR LITERATURE AND DETAILS.

IMMEDIATE DELIVERY

SEND FOR 220 PAGE FREE CATALOG

LAFAYETTE TOOL & SUPPLY CO.

128 LAFAYETTE STREET

NEW YORK 13, N. Y.



A POWER UNIT THAT PROVIDES WIDE RANGE OF APPLICATIONS

LeMaire

TWIN RAM



-vertically, horizontally, or at any angle

—in single or multiple arrangements

-can be transferred from one base to another

Send for complete catalog

LeMaire Tool & Mfg. Co. 2657 5. Telegraph Road

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-it Gear Chucks.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



Pratt Grinding Gauges caliper external cylindrical jobs while work is in motion or at rest. Adapted to straight or tapered work. Tolerances of .0001" plus or minus easily maintained. Visible check on out of roundness, rough grinding and chatter. Cannot grind work undersize unknowingly. Easily installed on any grinder. Pratt Grinding Gauges increase production, eliminate scrap and assure accuracy. A modern precision tool, ruggedly built.

DIAMOND TOOL & GAUGE CO.

15920 WOODINGHAM • DETROIT 21, MICH.

RECOVERY COMMITTEE

Appointment of a sub-committee to study problems related to the European recovery program was announced by Paul G. Hoffman, president of the Studebaker Corporation and chairman of the Committee for Economic Development (285 Madison Ave., N. Y. 17). The subcommittee has begun work on its study and will submit its findings to the CED Research and Policy Committee, of which Raymond Rubicam of New York is chairman.

Wayne C. Taylor of Washington, D. C.,

former president of the Export-Import Bank, is chairman of the new sub-The committee other members are Henry P. Bristol, president, Bristol-Myers Co. New York: Chester C. president. Davis. Federal Reserve Bank of St. Louis: Mr. Hoffman; Jay C. Hormel, chairman of the board. Geo. A. Hormel & Co., Austin, Minn.; Thomas B. Mc-Cabe, president, Scott Paper Co., Chester, Pa.; Philip D. Reed, chairman of the board, General Electric Co., New York; Nelson A. Rockefeller. New York; Mr. Rubicam; Beardsley Ruml, chairman of the board. R. H. Macy & Co. Inc., New York; J. Cameron Thomson, president. Northwest Bancorporation. Minneapolis.

"The report of this sub-committee will be studied by the CED Research and Policy Committee as the whole subject of European recovery has a vital bearing on the American economy and the

maintenance of high production and employment in this country." Hoffman said. "After the report has been studied a decision will be reached as to whether the findings will become the subject of a CED research and policy statement or whether they will be handled in some other manner," he added.

Among members of the CED Research and Policy Committee are Mr. Rubicam. chairman; Mr. Davis, vice chairman; William Benton, chairman of the board, Encyclopedia Britannica Inc., New York; John D. Biggers, president, Libbey-Owens-Ford Glass Co., Toledo.



IMPROVE PRODUCT PERFORMANCE

with HAN-DEE Springs, Wire Forms and Screw Machine Products

A spring for every purpose, no matter how small, can be engineered for your product by HAN-DEE, in the quantity you desire. Individual attention will be given to your unusual problems by our competent engineering staff.

Facilities for machining castings and small assemblies.

For prompt efficient service . . . for quality springs at low cost, consult HAN-DEE, A sample or blueprint will bring a prompt quotation.

THE HAN-DEE SPRING and MANUFACTURING CO. 2070 PARK STREET HARTFORD, CONNECTICUT



FAST, ACCURATE SPACING

Graduated in thousandths, you have plus or minus .0005" at your fingerties with

DAYTON ROGERS

ADJUSTABLE

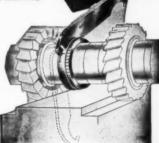
SPACING COLLARS

You can make an accurate, positive adjustment just by loosening the cutter arbor nut and making adjustment as illustrated.

Made in 12 standards for cutter arbors from 1/4" to 2". Write for illustrated Bulletin 120-7.

DAYTON ROGERS MFG. CO. 2849 12TH AVE. SO., MINNEAPOLIS 7, MINN.







Write for 166-page catalog

GITS BROS. MFG. Co.

1860 S. Kilbourn Ave., Chicago 23, Illinois

Exclusive for over 40 years

KOPPER CO. EMPLOYES WIN TWO LINCOLN FOUNDATION PRIZES

Employees of Koppers Company, Inc., Baltimore, Md., captured two of the prizes in the \$200,000 Design-for-Progress Award Program, sponsored by the James F. Lincoln Arc Welding Foundation (Cleveland I, Ohio). First prize of \$13,200 went to members of the Aeromatic Propeller Department of Koppers for their paper entitled, "Development of Arc Welded Propeller Hubs," and the fourth Containers Classificational Award of \$1,300 went to Arthur C. Thompson, general

superintendent in the Shops Division.

The authors of the grand award winning paper were Paul Hackethal, chief C. C. engineer: Mast, shop superintendent; and D. W. Hamilton, weld-ing foreman. Cited by the authors were John D. Waugh, public relations representa-tive; T. F. Naylor, materials engineer; and V. B. Benfer. sales engineer, all of whom assisted the extensive preparation work which went into the comprehensive 7,500-word paper.

The prize-winning Aeromatic paper traced the evolution of three hub designs from heavy, expensive forgings to the present tubular design, are welded structure. It was disclosed that the 200 h.p. Aeromatic hub was reduced in weight from 17.8 lbs. to 12.2 lbs., or a 31.5 percent saving for the welded structure over the forged unit. total cost reduction amounted to a 42.8 percent saving with arc welding. In the weight critical, low

horsepower range, the 85 to 165 h.p. flange model Aeromatic hub was found to weigh only 5.6 lbs. welded, compared to 8.8 lbs. when derived from a forging. The weight saving in this instance amounted to 36.4 percent. The resulting total weight of 32 lbs. for as high as 165 h.p. is noted as being the best weighthorsepower ratio ever recorded for a light variable-pitch propeller.

This particular Lincoln Foundation Award Program is the first of the postwar period, continuing the series of con-

tests held before.

get STAR satisfaction from this complete line

IN THE complete STAR line, there's a STAR blade for every kind of job and whatever the job, you'll find your hack saw or band saw doing it better with a STAR blade.

Tell your supplier what you want. Let him select your blade or frame from the complete STAR performanceproved line. You'll have a faster, cleaner cutting, longer lasting blade; you'll have the right

blade, a STAR BLADE!

HAND BLADES

O STAR SPEED

POWER BLADES

FRAMES



BAND SAWS (Metal cutting, including Skip-tooth)



Speed-Right SMALL HOLE Speed-Right Automatic Drill Heads maintain the Right speed and proper rate of feed for faster, more accurate small hole production drilling. Spindle speed and rate of feed are completely adjustable to the exact requirements of your .004" to 5/32" diameter drilling job. Write for our new bulletin, "Five Steps to Faster Production Drilling. THE ELECTRO-MECHANO CO 261 EAST ERIE STREET MILWAUKEE 2. WIS

Mechanics Through the Ages



the No.24



It's a fist-ful of power . . . for drilling metal, wood or composition materials. Light enough to swing easily overhead or horizontally at arm's length. Compact enough for close-quarter work. Made the way Stanley makes all tools . . . sturdy, for years of useful life. Capacity, ½4"; length 8½4"; weight, 3½ lbs.

Economical drill press . . . Locked in the Stanley Drill Stand No. 514, the No. 24 doubles its utility . . . becomes an efficient drill press for a variety of light drilling jobs.





Stanley Electric Drills come in a full range of sizes for wood or metal drilling. Available from Stanley distributors. Write for descriptive literature. Stanley Electric Tools, 512 Myrtle Street, New Britain, Conn.

THE GREATEST NAME IN TOOLS

STANLEY

Reg. U.S. Pat. Off.

HARDWARE . HAND TOOLS . ELECTRIC TOOLS

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

WHATEVER YOU NEED, YOU'LL FIND IT HERE

Compiled for quick reference and for your convenience, this handy index of products shows the pages on which you will find the items advertised in this issue. When writing to advertisers it will be appreciated if you will mention MACHINE and TOOL BLUE BOOK.

In the event you are unable to find the product or equipment you need, please write us and we'll be glad to supply the information. No obligation. Hitchcock Publishing Company, 542 South Dearborn Street, Chicago 5, Illinois.

Abrasive Cloth, Paper, Disc, Belts, Wheels, Stones, Etc., 36, 104, 107, 128, 129, 221 Accounting Machines, 230 Air-Operated Equipment (Look for specific item) Angle Rolling Machine, 333 Angles, 153, 257, 278

Arbor Spacers, 287

Balancing Machines, 13, 294
Balancing Ways, 253
Bearings, Oilless, 259
Bearings, Roller, 76
Bending Equipment, 147
Blades, Band Saw, 60, 95, 137, 339
Blades, Hack Saw, 80, 137, 339
Bores, lig, 229
Boring Bits, 78
Boring, Drilling and Milling Machines, 89, 157, 318
Boring, Drilling and Tapping Machines, 92, 325
Boring and Facing Tool Heads, 327
Boring Machines, 175
Boring and Reaming Tools, 320
Boring Grant Samples, 175
Boring and Reaming Tools, 320
Boring Reaming, Tapping Units, 335
Brakes, Apron, 228
Brakes, Press and Benling, 11, 35, 182
Broaches, 273
Broaching, Machines, 96
Buffers, Portable Electric, 200

Cam Blanks, 290
Carbides, 285
Carbides and Special Cutting Tools, 65, 119, 205, 297, 313, 332, 333
Castings, Aluminum, 146
Centering Machines, 27
Centers, Bench, 275
Centers, Lathe, 290
Centers, Live, 48, 81, 111, 275, 287, 311

Bushings, Drill. Jig. 59, 75, 115, 313

Chucking and Indexing Fixtures, 234
Chucks, 335
Chucks, Air-Operated, 25, 77, 193
Chucks, Collet, 30, 139
Chucks, Diaphragm, 70, 241
Chucks, Diaphragm, 70, 241
Chucks, Diaphragm, 70, 241
Chucks, Lathe, 30
Chucks, Magnetic, 30, 50, 160, 161
Clamps, 62
Clamps, 70qqle, 90
Clamps, 70qqle, 90
Clutches, 56, 247, 329
Comparators, 27, 199, 270
Compressors, 217
Counterbores, 10
Couldings, Air, 247
Couplings, Air, 247
Cut-Off Machines, 116, 117
Cutters, Boring, 118
Cutters, Milling, 66, 236, 316
Cutters, Red, 269
Cutters, Slotting, 324
Cutting Machines, Hydraulic, 171
Cylinders, Air, 109, 166, 183
Cylinders, Air, 109, 166, 183
Cylinders, Hydraulic, and Pneumaters, 15, 77, 109, 120

Degreasers, 251
Demagnetizers, 30
Diamond Powder, 268, 308
Diamond Wheels, 285, 330
Die Casting Machines, 74, 82
Die Feeds, 53
Die Filer, 303
Die Making Machines, 31, 245, 281
Die Sets, 72, 176, 258, 269
Dies, 27, 29, 250, 275, 319
Diesel Engines, 66
Dividing Heads, 30, 313
Dogs, Lathe, 216
Dowel Pins, 37, 243
Dressing Fixtures, Grinding Wheel, 179
Drill Heads, 219, 305, 317, 328, 330
Drill Jigs, 242
Drilling and Centering Machines, 179
Drilling Fixtures, 291
Drilling Machines, Multiple Spindle, 105

A Profit Producer Right from the Start

The New GREAVES No. 2-H MILLING MACHINE Plain or Universal



Greater accuracy, higher and better productivity, lower production costs. 18 spindle speeds (20 to 1000 rpm). Heavy duty or light precision work. Simple in design. Easy to operate. Built to work well and wear well. A profit producer right from the start. Send for free bulletin describing the new Greaves No. 2-H milling machine.

DEALER TERRITORIES AVAILABLE

Write for Complete Details



Drilling Machines, Vertical, 79, 347
Drilling Units, 165
Drills, Carbide, 331
Drills, Center, Core, Twist, Square, etc., 348
Drills, Portable Electric, 341, 356
Drills, Portable Electric, 341, 356
Drills, Portable Electric, 341, 356
Duplicatina Machines, 44
Dust Control Equipment, 16, 102, 356
Hammers, Pneumatic, 186
Handling Equipment, 255
Heads, Collet, 241
Heads, Die, 39
Heads, Die, 320
Holders, Tap, 52, 123
Holders, Tap, 52, 123

End Mills, 160, 161, 311 Engraving Machines, 318 Etchers, 273

Face Mill, 41 Files, 97, 169, 173, 201 Finishing Machines, 13 Flangers, 20, 21 Flexible Shaft Equipment, 113, 116, 117, 143, 198, 202, 234 Form Tools, Circular, 236 Furnaces, Heat Treating, 94, 257, 285, 295, 351

Gage Blanks, 223
Gage Blocks, 207
Gages, 3, 70, 140, 270, 275, 290, 298, 331, 336
Gages, Pin, 122
Gears, 83, 180, 269, 313, 315
Grinder-Polisher, 210
Grinder-Rollisher, 210
Grinders, Bench, 87, 300, 309, 356
Grinders, Centerless, 8, 9
Grinders, Centerless, 8, 9
Grinders, Cylindrical, 32B, 32C
Grinders, Cylindrical, 32B, 32C
Grinders, Disc, 33
Grinders, Drill, 31
Grinders, Drill, 31
Grinders, External or Internal, 33, 197
Grinders, Pedestal, 26, 244, 356
Grinders, Profile, 303
Grinders, Profile, 303
Grinders, Forlibe Electric, 63, 66, 189, 194, 195
Grinders, Rotary Die, 186
Grinders, Rotary Die, 186
Grinders, Surface, 19, 58
Grinders, Rotary Die, 186
Grinders, Thead, 27
Grinders, Toolcom, 2
Grinders, Thead, 27
Grinders, Toolcom, 2
Grinding Attachments, 230
Grinders, 213
Gurdes, 213
Gurdes, 213
Gurdes, 213
Gurdes, 213
Gurdes, 214
Gurdes, Tap, 237
Guns, Atr, 185
Guns, Chip, 264

Hammers, Pneumatic, 186
Handling Equipment, 255
Heads, Collet, 241
Heads, Die, 39
Heads, Tapping, 317
Hinges, 313
Holders, Die, 32D
Holders, Top, 52, 123
Holders, Tool, 4, 73, 216, 291
Hole Locating Accessories, 177
Holding Equipment, 255
Hollow Mills, 321
Honing Machines, 7, 88
Hydraulic Equipment (Look for specific item)

Illuminating Devices, 297 Impact Tools, 91 Indexing Heads, 176 Indexing Machines, 299 Indicators, 137, 199, 315 Inspection Devices, 289, 297

Jig Borers, 177 Jig Boxes, 246 Jigs and Fixtures, 70 Jointers, 40 Joints, Universal, 34

Keyseaters, 311, 325 Keyway Broach Kits, 267 Keyway Cutting Machines, 348 Knurls, 311 Knurls, Holders, 265

Lappers, 32B, 32C
Lapping Equipment, 323
Lathes, Automatic, 13, 27
Lathes, Duplicating, inside back covet
Lathes, Gear, 32A
Lathes, Polishing, 106, 116, 117, 232, 356
Lathes, Proclision, 106, 238, 272, 303
Lathes, Production, 110
Lathes, Turret, 2, 13, 17, 27, 124
Layout Dies, 305
Layout Materials, 260, 315
Levels, 329
Locaters, 182
Locators, Optical, 263
Lubricating Compounds, 316
Lubricating Compounds, 316
Lubricators, 51, 55, 338

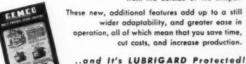
Magnifiers, 303
Maintenance Materials, 145, 262
Mandrels, 112, 222, 229
Marking Machines, 224
Measuring Instruments, 140, 278
Measuring Machines, 42
Metals, Perforated, 322
Micrometers, 3, 14
Milling Head Attachments, 57
Milling Machine Attachments, 23, 302

Hammers, 273, 307



In this New Model Universal Shaper, GEMCO engineers have incorporated these 3 new, additional features—

- Built-in Power Rapid Traverse—combines both horizontal and vertical selective feed and power movement to the Work Table.
 - New ease in operation—4-way control of Table feeds now easily accomplished by simple gear shifting device located at operator's side of machine.
 - Re-located Oil Pump and Filter—readily accessible from the outside of the Shaper



Write Now for Bulletin GC-13B



4417 OLEATHA AVE. ST. LOUIS 16, MO.

Machinery Since 1917

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Milling Machines,
Milling Machines,
Milling Machines,
Milling Machines,
Milling Machines,
Milling Machines,
Dock cover
Milling Machines,
Dock Cover
Milling Machines,
Universal, 237, 343,
Milling Machines,
Vertical, 23, 49, 71,
Mills, Hellow, 47
Molders, 200
Molds, Copper,
Motors, 26, 116, 117

Ontical Flats, 270

Parallels, 153, 257, 278

Plates, Lapping, 257

Plates, Surface, 32, 153, 257, 278, 315

Polishing Machines, 35, 356

Polishing Wheels, 76

Portuble Tools, 63, 318

Presses, Air, 25, 279, 309

Presses, Arbor, 24, 227

Presses, Drill, 40, 116, 117, 126

Presses, Poull, 40, 116, 117, 126

Presses, Poull, 40, 116, 117, 126

Presses, Poull, 66, 275, 334

Presses, Punch, 66, 286, 288

Presses, Punch, 68, 286, 288

Presses, Spring, 217

Pullefs, Die Set, 51

Pumps, 66

Pumps, Coolant and Lubricant, 77, 93

Purches, 250, 319

Pyrometers, 313

Racks, 247
Reamer Driver, 308
Reamers, 236, 348
Reaming Machines, 118
Reel Stands, 100, 269
Reel Stack, 305
Riveters, 109, 326
Riveting Machines, 84, 281, 321
Roll Feeds, 100, 293
Roll Forming Machines, 20, 21, 275
Routers, 356

Sander Heads, 200
Sanding Machine, Belt, 40, 303
Saw, Arbor, 54
Saw Sharpeners, 228
Sawing Machines, Band, 22, 40, 99, 116, 117, 201
Sawing Machines, Hack, inside front cover, 30
Sawing Machines, Hack inside front Saws, Slotting, 28
Screw Drivers, Power, 256, 356
Screw Machines, Automatic, 85, 92
Screw Machines, Hand, 279
Screw Machines, Hand, 279
Screw Machine Products, 279, 337

Screws, Cap. Set, Socket and Machine, 37, 181, 281, 311
Screws, Transfer, 279
Seamers, 20, 21
Services: Milling, Grinding, Lupping, Rebuilding, Repairing, Business, etc., 29, 108, 140, 260, 271, 281, 297, 313, 314, 315, 317
Shapers, 11, 32A, 238, 345
Shapers, Gear, 114
Sharpeners, Drill, 250
Shearing Machines, 11, 20, 21, 319
Shearing Machines, 11, 20, 21, 319
Shearis, Throatless, 209, 266
Sine Bars, 271
Slide Tools, 17
Sockets, 46
Soldering Tools, 279
Spacing Collars, 337
Speed Reducers, 12, 305
Spindles, 191, 287
Spring Winders, 290
Stamps, 254
Stamps, Steel, 144, 209
Steel and Steel Stock, 130, 137, 148
268
Stock Stands, 315
Stud Setters, 39
Surfacer, Belt, 271
Surfacers, 116, 117
Switches, 29, 30, 223

Tables, Elevating, 243, 325
Tables, Rotary and Index, 71, 215, 222, 335
Tap Extractors, 342
Tapping Attachments, 123, 327
Tapping Machines, 79, 123, 271
Tapping Machines, 79, 123, 271
Tyr, 353, 356
Taps, 3, 29, 39, 274
Thread Rolling Machines, 29
Threading Machines, 79, 140, 277
Tires, 121
Tool Accessories, Portable, 194, 195
Tool Bits, 73
Tools, Boring, 65, 118
Tools, Portable, 189, 194, 195
Tools, Turning, 38
Tole Pans, 315
Transfer Machines, 92, 196
Transmissions, 202, 394
Turrets, Lathe, 249, 255

Valves, 15, 45, 144, 166 Vises, Bench and Machine, 18, 25, 30 153, 215, 224, 233, 247, 265, 273, 297 315

Way Curtains, 290
Welding Equipment and Supplies, 1, 98, 220, 355
Wheels, Band Saw, 121
Wrenches, 64

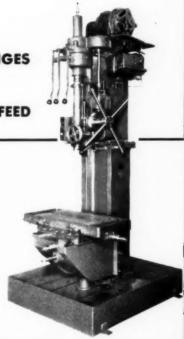


UNIVERSAL QUICK CHANGE DRILL

...with 12
INSTANTANEOUS CHANGES
OF SPEED
AND WITH SELECTIVE FEED

It's heavy, rigid and versatile... this Baker Drill of the Universal Quick Change type. Assures maximum out of twist drills up to 1½" diameter. Used for heavy duty boring and facing as well as for drilling.

Shown here is Model 150 with standard compound table. Speed and feed changes convenient to operator. Baker-built dependability... engineered to do the job better and help increase productivity. Write for more details.



BAKER BROTHERS, Inc., Toledo, Ohio

DRILLING, TAPPING, KEYSEATING and CONTOUR GRINDING MACHINES

NEW

SURPLUS

SETS OF TOOLS

No. 1-5 M. T. Reamer Sets, 5 Reamers in Box, \$ 5.00 set

A-Z H.S. Drills, 26 Drills with Stand, \$12.50 set

1/16"-1/2" H.S. Drills, 39 Drills with Stand, \$13.50 set

VICTOR MACHINERY EXCHANGE, INC.

251 CENTRE ST.

NEW YORK CITY

CANAL 6-5575

NEW

SURPLUS

HIGH SPEED POWER BLADES \$6.00 PER DOZEN

14" x 11/4" 4 Teeth

14" x 11/4" 6 "

14" x 11/4" 10 "

17" x 1" 10 "

17" x 11/4" 4 "

17" x 11/4" 6 "

17" x 11/4" 10 "

VICTOR MACHINERY EXCHANGE, INC.

251 CENTRE ST.

NEW YORK CITY

CANAL 6-5575

Index to Advertisers

that there to Marking the 205	Cerro-de-Pasco Copper Corg. 9 Chandler Tool Co. 3 Chicago Drillet Corp. 2	14
Abart Gear & Machine Co	Chandler Tool Co3	6
Accurate Bushing Co	Chicago Drillet Corp	19
Ace Abrasice Laboratories 268	Chicago Mfg. & Distributing Co	
Ace Tool & Die Works 288	Chicago Pheumatic Tool Co	1
Acme-Danneman Co	Chicago Rivet & Machine Co.	ú
April Apri	Chicago Drillet Corp. Chicago Mfg. & Distributing Co. Chicago Pneumatic Tool Co. Chicago Rivet & Machine Co. Chicago Tool & Engineering Co. 3 Chicago Wheel & Mfg. Co. 194-1 Cincinnati Electrical Tool Co. 3	4
Acme Tool Co	Cincippati Electrical Tool Co. 3	i
Acro Metal Stamping Co	Cincinnati Grinders, Inc.	8
Aget-Detroit Co	Cincinnati Ericetrical 1001 Co. Cincinnati Grinders, Inc. Cincinnati Shaper Co. Circular Teol Co. Cleveland Ropublic Tool Corp. Cleveland Automatic Machine Co. Cleveland Republic Tool Corp.	1
Air-Trol Co.	Circular Tool Co	*
Alfway Pump & Equip, Co	Clemson Brothers Co	
Alco Tool Co	Cleveland Automatic Machine Co	3
Allied Products Core 319	Cleveland Republic Tool Corp	3
Allen Mer Co 37	Columbus Die, Tool & Machine Co	4
American Diamond Tool & Gauge Co	Colwell Co., S. G	
American Drill Bushing Co	Commander Manufacturing Co	
American Saw & Mfg. Co 95	Continental Tool Works (Div Fr.Coll.0)	
American Society of Tool Engineers	Corn i	1
American Tool Works Co Inside Back Cover	Cleveland Republic Tool Corp. 2 Columbia Die, Tool & Machine Co. 2 Colwell Co. 8, G. Commander Mainfacturing Co. 2 Commander Mainfacturing Co. 2 Continental Tool Works (Dr. Ex-Cell-O Continental Tool Works (Dr. Ex-Cell-O Contest Clutch Co. 3 Corlett-Turner Co. 3 Corlett-Turner Co. 2 Cullman Wheel Co. 2 Cullman Wheel Co. 3 Cullman Wheel Co. 3 Collett-Turner Co. 2 Cullman Wheel Co. 3 Cullman Wheel Co. 3	i
Anderson Tool Works, Inc.,290	Cooley Electric Mfg. Corp	I
Anderson Bros, Mfg. Co	Corlett-Turner Co	8
Anderson Oil Co	Cullman Wheel Co	1
Andersons, The 972	Curtis Universal Joint Co. Inc.	5
Arganum Alaminum Fanndey 146	Cultinan Wheel Co. Curtis Universal Joint Co. Inc. Cushman Chuck Co.	1
Anderson Oil Co. 248 Andersons, Inc. 236 Annis Co. R. 273 Areanum Atuminum Foundry 146 Arguto Oilless Boaring Co. 259 Armstrong Bium Mig. Co. Inside Pront Cover Armstrong Bros. Tol Co. 4 Arter Grinding Machine Co. 197 Mantie Geer Works 313 Matter Gring & Mig. Co. 313 Moy Drilling Machine Co. 105		
Armstrong-Rium Mfg. Co. Inside Front Cover		
Armstrong Bros. Tool Co 4	D	
Arter Grinding Machine Co197	_	
Atlantic Gear Works313	Dahlstrom Mfg. Co2	1
Atlas Press Company 54	Dake Engine Co	7
Auto Moulding & Mig. Co	Dahlstrom Mfg. Co. 2 Dake Engine Co. Danly Machine Specialties 1 Danly Machine Specialties 1	Ĵ
tey Drilling Machine Co	Danville Tool Corp.	
	Dayton Rogers Mig. Co	(8)
	Detroit Donor Sarandaires C. 9	
	Danily Machine Specialties 1	É
В	Dickerman Mfg Co H E	ā
	Diehl Machine Works, G. M	2
taker Brothers Inc 347	Disston & Sons, Henry	0
Baldor Elec. Co	Dixon & Ryan Co2	8
Sarber-Colman Co 67	DoAll Co	9
Bath Co., John	Dorman Machine Tool Wks	210
Baumbach Mfg. Co., E. A269	Dreis & Krump Mfg. Co	• 1
Bay State Abrasive Products Co	DoAll Co. Dorman Machine Tool Wks	1
Sear Mig. Co	Dukam Co	4
Sehr-Manning GS	rywiii (t) manaanaanaanaanaanaanaanaa	
laker Brothers, Inc. 347 ladfor Elec. Co. 203 larber-Colman. Co. 67 lath Co., John 3 saumbach Mfg. Co. E. A. 269 lay State Abrasive Products Co. 107 sear Mfg. Co. 294 tehr-Manning 36 tenchmaster Mfg. Co. 68 tenton Company 182 everly Blacksmith, Inc. 32-D teverly Blacksmith, Inc. 264 laner Mfg. Co., John 290 domfield 100 loomfield Tool Corp. 315 coice-Crane Co. 40 lookun Tool Co. 65 tridgeport Machines Inc. 43		
Reverly Blacksmith, Inc. 32-D		
Reverly Shear Mfg. Co	E	
Slaner Mfg. Co., John		
Bloomfield Tool Corp315	East Shore Machine Products Co	7
Soice-Crane Co 40	Economy Meh. Products Co. 2 Edroy Products Co. 3	8
Bokum Tool Co	Edroy Products Co3	0
Fridgeport Machines Inc.	Eisler Engineering Co	9
Frown Corp., W. R	Electro-Mechano Co3	3
trown & Sharpe Mfg Co 160-161	Elgin Tool Works1	-
fokum Tool Co. 0.3 gridgeport Machines Inc. 49 grown Corp. W. R. 18 grown Engineering Co. 247 grown & Sharpe Mfg. Co. 160-161 lub & Son, George F. 313 suffalo Forge Co. 147 suffalo Forge Co. 264 suffalo Co. 264	Eakro Co	7
Ruffalo Forge Co	Engis Equipment Co. 22	ä
Suffalo Mehy, Co	Eisler Engineering Co.	9
Burke Machine Tool Co237	Errington Mechanical Laboratory 3	ĩ
Buffalo Mehy, Co	Esco Engineering Co. (Acme-Danneman)2	4
	Etteo Tool Co2	8
	Engles Equipment Co	3
C		
adillac Cutter Co	,	
amras Equipment Co. 186 arborundum Co. 128-129	Fakes & Co., Jos B	1
arborundum Co128-129	Federal Foundry Supply Co2	6
ardinal Machine Co	Federal Press Co	3
Archive Arch	Florrock Company	6
lanter Froducts Co	Fakes & Co. Jos B. 3 Federal Foundry Supply Co. 2 5 5 6 7 6 7 6 7 6 7 6 7 6 7 6 7 7	ő
enter Scope Products	Foresen Co. Gale 9	3

HEAT TREAT

SMALL PARTS, TOOLS & DIES

In Your Own Plant

- Install anywhere by simple wire connection.
 Quiet in operation. No fumes or odors—no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts . . . Small batches . . Running pilot lots to predetermine mass production techniques . . Emergency repairs . . Industrial and laboratory testing . . Miscellaneous controlled heating jobs.



CHAMBER		8"W 6	"H 14"	L		10"W	5"H 18"	L	8"'W	6"H	14"L
FROM COLD	18	350° F. in	55-65 m	in.	18	850° F. in	55-65 m	in.	2000°	F. in 2	1/2 hrs.
AMPERES		14.8 at	230 v.			19.6 at	230 v.		20.	2 at 2:	30 v.
WATTS		34	100			450	00			4650	
MODEL*	MH-3	VH-3	MK-3	VK-3	MH-4	VH-4	MK-4	VK-4	-	VK-5	
PRICE	160.00	185.00	200.00	225.00	245.00	270.00	285.00	310.00	3	140.00	

K models include Selective Power Modifier for input control to correct temperature lag.

* M models complete with hinged door and hearth plate.

V models have counterweighted vertical lift door.

ACCESSORY EQUIPMENT

Electronic operated Veri-tron indicating and controlling	
pyrometer, with thermocouple and lead wire\$	143.00
Same in self-contained, enclosed panel including line switch	
and fuses, with steel stand—completely wired	250.00
	35.00

DEALERS AND DISTRIBUTORS WANTED!

Good territories open on this extensive line of selfcontained small electric furnaces. Investigate now.

FORCED CIRCULATION AIR DRAW FURNACES — Write for data.

FREE

NEW CATALOG completely describes all models and applications for each. Write today for your copy ... no obligation.



COOLEY ELECTRIC MANUFACTURING CORP.

36 South Shelby Street Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.
Export Manager, 44 Whitehall Street, New York, New York

oster Engineering Co 331 ulflo Specialties Co. 93 ulmer Co. C. Allen 7	L. & J. Press Corp
G	Lassy Tool Company 27 Lee Co., K. O. 15
	LeMaire Tool & Mfg. Co33
airing Tool Co	Lemert Engineering Co32
alland-Henning Mfg. Co	Lenox Instrument Co
allmeyer & Livingston Co	Libert Machine Co., T. H
ardner Machine Co	Lima Electric Motor Co. 2
ear terinding Machine Co	Lincoln Park Mfg Co. 31
eneral Engineering & Mfg Co. 245	Linderme Machine & Tool Co32
enesce Mfg. Co. Inc. 47	Linley Brothers Co22
Isnolt Machine Co	Littell Machine Co., F. J14
its Brothers Mfg. Co	Logan Engineering Co32.
lenzer Co., J. C111	Logansport Machine Co
orton Machine Co., Geo167	Lovejoy Frexible Coupling Co
ovro-Nelson Company	Lucas & Son. J. L. 31
ruham Mfg. Co. 30nn H	Luma Electric Equipment Co
airing Tool Co. 41 alland-Henning Mfg. Co. 15 ear Grading Mcone Co. 18 ear Grading Co. 10 ear Specialtics Co. 18 ear Grading Co. 10 ear Specialtics Co. 18 ear Grading Co. 18 ear Co. 19 ear Co. 18 ear Co. 18 ear Co. 19 ear Co. 18 ear Co. 19 ear Co. 18 ear Co. 18 ear Co. 19 ear Co. 18 ear Co. 18 ear Co. 19 ear Co. 18 ear	Lyon Machine Co31:
reenlee Brothers & Co	
rob Brothers	M
rob Brothers 281 robet File Co. of America 173	
	M. B. Products Co. 188 Machine Products Corp. 27' Madison-Kipp Corp. 25' Madison Mfg. Corp. 11' Majestic Drill Sharpener Co. 25' Maphewood Machinery Co. 27' Marshall Steel Co. 26' Marshall Steel Co. 26' Marshall Steel Co. 20' Martin Machine Works, J. E. 31' Master Tool Co. 22' Mateo Tool Co. 24' Matticks Mfg. Co. 27' McGill Carbide Tool Co. 33' Mead Specialties Co. 2' Mead Specialties Co. 2'
	Machine Products Corp278
	Madison Mfg Corp. 111
H	Majestic Drill Sharpener Co. 256
The state of the s	Maplewood Machinery Co
all Level & Mfg Ws. 329 smilton Tool Co. 325 sammond Machinery Builders 146 sam-Des Sering & Mfg Co. 337 saring & Mfg Co. 337 saring & Mfg Co. 337 saring & Mfg Co. 327 saring & Mfg Co. 327 saring & King Perforating Co. 322 sartord Special Machinery Co. 229 sartord Special Machinery Co. 229 sartery Mfg Co. 42 savil Mfg Co. H. L. 82 sakins Co. R. G. 198 eim Co. 76 eiman Mfg Co. 279 erman Stone Co. 322 obart Brothers Co. 1 ogsson & Pettis Mfg Co. 209 orberg Gage Co. 122 owe & Son Inc. 228 umm Safety Equipment Co. John 305 uron Machine Products 223	Marshall Steel Co
amilton Tool Co325	Marshalltown Mfg. Co209
ammond Machinery Builders146	Martin Machine Works, J. E31
an-Dee Spring & Mfg. Co337	Marvel Tool & Machine Co273
ardingo Brothers Inc.	Mateo Tool Co. 941
arrington & King Perforating Co. 299	Matticks Mfg. Co. 273
artford Special Machinery Co. 200	McGill Carbide Tool Co. 331
arvey Mfg. Corp. 245	Mead Specialties Co
arvill Mfg. Co., H. L. 89	Mercoid Corp
askins Co., R. G	Merz Engineering Co 42
eim Co	Metal Removal Co285
elman Mfg. Co279	Metol Corp311
obart Brothers Co	Michigan Chrome & Chemical Co. 205
orgson & Pottis Wer Co	Michigan Drill Head Co. 305
orberg Gage Co. 199	Midwest, Tool & Engineering Co. 243
owe & Son Inc. 998	Miller & Crowningshield Co. 230
umm Safety Equipment Co. John 305	Milwaukee Chaplet & Mfg. Co303
uron Machine Products	Modern Motor Drives Div.
	(Nicholas Eng. Co.)217
	Moline Tool Co. 39
	Moore Special Tool Co 177
1	Motch & Merryweather Co. 196
	Motor Tool Mfg. Co 48
deal Industries 81 adex Machine 70 dustrial Products 287 gersoll-Rand 91	Matticks Mig. Co. 33
gersoll-Rand91	
	N.
	N
,	National Acme Co
Comment of the second s	Nebel Machine Tool Co
hausson Div (Ford Motor Co	New Arbany Machine Mig. Co
efferson Machine Tool Co 363 phaneson Div. (Ford Motor Co.) 207 phason Div. 219 phason & Sons. Wm. 228 mes & Lamson Machine Co 27	Div.)
hnson & Sons, Wn. C 228	New Britain Tool & Mfg. Co. 273
nes & Lamson Machine Co. 27	New England Gear Works
The state of the s	New Methods Steel Stamps, Inc
	Niagara Machine & Tool Works20-21
	Nichola Morris Com (Modern Motor Drives)217
K	Vicholson & Co W H
	Nicholson File Co. 97 100
empsmith Machine Co	Nielsen Tool & Die Co 31-163
empsmith Machine Co. 23 emnametal, Inc. 316	Nielson, Inc
penig, Wm. A	Norgen Co., C. A 55
yle-Johnson Machine Co216	National Acme Co. 272



WRITE FOR . .

. DESCRIPTIVE BULLETIN

TON MACHIN

Numberall Stamp & Tool Co254	Standard Transmission Equipment Co. 304 Stanley Works
Nu-Tangs Inc	Stanley Works341
the tange that	Staples Tool Co
	Stark Tool Co. 13.
0	Stokerunit Corp. 85
*	Strand & Co., N. A234
O. K. Tool Co	Strand Manufacturing Co213
Oliver Instrument Co	Sturdinatic Tool Co
O'Neill-Irwin Manufacturing Co	Sturdy Breaching Service
	Sundstrand Machine Tool Co. 276
	Suppose Products Co
P	Super Tool Co
Pathon Mg. Co 183 Pedersen Brothers Tool & Supply Co. 271 Phillips Mg. Co. 251 Plunket Machine Co. J. E. 297 Preumatics, Inc. 166 Pope Machinery Co. 191 Porter Machine Co. 291 Porter-Cable Machine Co. 210 Potter & Johnston Mch. Co. 17 Precise Products Co. 318 Procunier Safety Cluck Co. 23 Production Machine Co. 271 Product Machine Co. 272 Product Machine Co. 72	Surface Combustion Corp. (Heat Treating Div.) 257
Pathon Mig. Co	Syntron Company
Phillips Mfg Co. 251	
Plunket Machine Co., J. E297	
Pneumatics, Inc166	T
Pope Machinery Co	
Porter Machine Co.	Tamms Silica Co
Porter-Cable Machine Co	Tannewitz Works
Procise Products Co	Taylor & Fenn Company 217
Procunier Safety Chuck Co	Tecter, C. B
Production Machine Co271	Thriftmaster Products Corp164
Producto Machine Co	Timesaver Products Co323
Proser & Son, Thomas	Tolikins-Johnson Machine Co
Production Machine Co	Torit Manufacturing Co. 102
Lymnett Mattheware Co. Commission	Tamms Silica Co. 145 Tannewitz Works 257 Tatra Tool Co. 257 Taylor & Fenn 200 257 Taylor & Fenn 200 257 Taylor & Fenn 200 200 Timesaver Products Corp. 164 Timesaver Products 20 20 Tool Supply Co. 290 Torit Manufacturing Co. 102 Tere Tool Evidence 57 Trindl Products Ltd. 355 Troyle Mg Co. 215 292 313 Tubular Micrometer Co. 11 100
	Trindl Products, Ltd
0	Troyke Mfg. Co215-222-313
· ·	Tubular Micrometer Co 1+
Queen City Tool Co244	
	U
R	
N.	I' S. Electrical Tool Co. 87 U S. Steel Supply Co. 148 Universal Engineering Co. 290 Universal Gear Works 180
n t to Tool Holder Corn 301	U. S. Steel Supply Co
D & I Tools 38	Universal Gear Works 180
Racine Tool & Machine Co	
Rathbun Co., Louis C	
Rathbun Co., Louis C	
Rathbun Co. Louis C. 284 Reading Machine Co. 325 Reich Mfg. Co. 315 Reich Mfg. Co. J. R. 274	
Rathbun Co. Louis C. 284 Reading Machine Co. 325 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Pient Lethor & Grinder Inc. 23	٧
Rathbun Co. Louis C. 28 c Reading Machine Co. 325 Reich Mfg Co. J R. 315 Reiff & Nestor Co. 274 Rivett Lathe & Grinder. 2 Rockford Clutch Div. 329	V
Rathbun Co., Louis C. 254 Reading Machine Co. 32-5 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Rivett Lathe & Grinder, Inc. 26 Rockford Clutch Div. 325 Ross Co., Thomas G. 112	V Vanderwall Co., E. H. 250 Vender Banet Core
Rathbun Co., Louis C. 251 Reading Machine Co. 325 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Rivett Lathe & Grinder, Inc. 2 Ross Co., Thomas G. 112 Ross Operating Valve Co. 45	V Vanderwall Co., E. H. 290 Vascoloy-Ramet Corn. 1119 Vorsey, Machine Works 298 298
Rathbun Co., Louis C. 25 t Reading Machine Co. 3 2-5 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Rivet Lathe & Grinder, Inc. 2 Rockford Clatch Div. 329 Ross Co., Thomas G. 112 Ross Co., Thomas G. 6 Rotor Tool Co. 63	V Vanderwall Co., E. H. 290 Vascoloy-Ramet Corp. 119 Veteran Machine Works 298 Victor Machinev Exchange 348-349
Rathbun Co., Louis C. 224 Reading Machine Co. 325 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Rivett Lathe & Grinder, Inc. 32 Ross Co., Thomas G. 12 Ross Operating Valve Co. 63 Rotor Tool Co. 325 Rouse & Co., H. B. 325 Ross Operating Valve Co. 63 Rouse & Co., H. B. 325 Ross Operating Valve Co. 64 Rouse & Co., H. B. 325 Ross Operating Valve Co. 64 Rouse & Co., H. B. 325 Ross Operating Valve Co. 64 Ross Operating Valve Co. 65 Ross Operating Valve Co. <td< td=""><td>V Vanderwall Co., E. H. 290 Vascoloy-Ramet Corp. 119 Veteran Machine Works 298 Victor Machinery Exchange 348-349 Vonnegut Moulder Corp. 200</td></td<>	V Vanderwall Co., E. H. 290 Vascoloy-Ramet Corp. 119 Veteran Machine Works 298 Victor Machinery Exchange 348-349 Vonnegut Moulder Corp. 200
Rathbun Co., Louis C. 25 Reading Machine Co. 32-5 Reich Mfg. Co., J. R. 315 Reiff & Nestor Co. 274 Rivett Lathe & Grinder, Ine. 2 Roekford Clutch Div. 229 Ross Co., Thomas G. 112 Ross Operating Valve Co. 45 Rotor Tool Co. 63 Ruleta Co. 269 Ruthout Tool Service 297	V Vanderwall Co., E. H. 200 Vascoloy-Ramet Corp. 119 Veterari Machine Works 220 Vetro Machinery Exchange 348-349 Vonnegut Moulder Corp. 200
Rathbun Co., Louis C. 24 to Reading Machine Co. 31 to Reading Machine Co. 32 to Reich Mfg. Co., J. R. 31 to Reiff & Nestor Co. 27 to Reiff & Nestor Co. 27 to Rivett Lathe & Grinder, Inc. 4 to Reiff & Nestor Co. 12 to Ross Co., Thomas G. 12 to Ross Co., Thomas G. 15 to Ross Operating Valve Co. 45 to Ross Operating Valve Co. 45 to Ross Co., Thomas G. 60 to Ross Co., Thomas G.	V Vanderwall Co., E. H. 290 Vascoloy-Ramet Corp. 119 Veterat Machine Works 298 Victor Machinery Exchange 348-349 Vonnegut Moulder Corp. 200
R. & D. Tool Holder Corp. 301 R. & L. Tools 38 Racine Tool & Machine Co. 171 Rathbun Co. 287 Readbin Co. 32 Read Inc. 32 Read Inc. 32 Reaff & Nestor Co. 274 Rivet Lathe & Grinder, Inc. 2 Ross Co. 112 Ross Co., Thomas G. 112 Ross Operating Valve Co. 45 Rotor Tool Co. 63 Ruleta Co. 49 Rutland Tool Service 297 Ryerson & Sons, Inc., Jos. T. 130	w
	w
s	w
s	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	w
\$ Sales Service Machine Tool Co	Wade Instrument Co
\$ Sales Service Machine Tool Co	Y
\$ Sales Service Machine Tool Co	Wade Instrument Co. 315 Walker Co., O. S. 315 Walker Turner Co. 116-117 Walls Sales Corporation 309 Water Turner Co. 242 Wardwell Mfg. Co. 242 Weeker Machine Corp. 220 Weltex, Inc. 310 Weltex, Inc. 310 White Dental Mfg. Co. 8 143 White Dental Mfg. Co. 8 143 White Metal Tool Co. 182 Wiener Machine Corp. 226 Wiley's Carbide Tool Co. 333 Wilson, K. R. 61 Winter Products Inc. 279-309 Wirth & Son, Carl 321 Wittek Mfg. Co. 100 Wolfs New Process Abrasive Wheel Co. 221 Woodworth Co. N. A. 70-241 Wyzenbeck & Staff Inc. 113
S	Vanderwall Co., E. H. 290 Vascoloy-Ramet Corp. 119 Veteran Machine Works 228 Victor Machiner Exchange 348-349 Vonnegut Moulder Corp. 200 W Wade Instrument Co. 315 Walker Co., O. S. 50 Walker Turner Co. 116-117 Walls Sales Corporation 300 Walton Co. 242 Wardwell Mfg. Co. 215 Weber Machine Corp. 320 White Dental Mfg. Co. 8 S. 143 Whitney Metal Tool Co. 182 Winder Machine Corp. 296 Willey's Carbide Tool Co. 383 Wilson, K. R. 61 Winter Products Inc. 279-309 Wittek Mfg. Co. 320 Wittek Mfg. Co. 41 Witter Mfg. Co. 41 Winter Products Inc. 279-309 Wittek Mfg. Co. 41 Winter Products Inc. 279-309 Wittek Mfg. Co. 41 Wyzenbeek & Staff Inc. 113 Y Yohe Supply Co. Win. S. 31-5 Young Afron Co. 225



A Range of Models for Every Welding Job!

"Job tested" TRINDL WELDERS, outstanding in the welding field because of the Simplified Operation and Ruggedness of Design and Construction, are unbeatable for practical efficient low cost operation. TRINDL Welders, preferred for general industrial, farm and automotive production, construction, maintenance and repair, are available in a range of models for every type of shop or welding job.



Dependable Trindl Welders, Welding Supplies & Accessories are Available to Save You Both ... Time and Money

Write, wire or phone today

FOR PARTICULARS AND CATALOGS
Jobber and Distributor Inquiries Invited.
Write for Selected Distributor Plan

TRINDL PRODUCTS LTD., 17 E. 23rd St., BG, Chicago 16, III.

ORDER NOW... for PROMPT DELIVERY!

Increased production now enables us to make exceptionally prompt delivery of THE CINCINNATI Electrical Tools. You can plan now to have your needs served quickly.

A. BALL BEARING PEDESTAL GRINDER—Designed and built for continuous production work and all general purpose grinding. Sizes: Up to 15 H.P.

B. BUFFING AND POLISHING LATHE—Especially designed, ruggedly built, for continuous service under most severe conditions. Sizes: Up to 15 H.P.

C. TOOL POST GRINDER—With or without feed, especially adapted for grinding lathe centers, cutters, reamers, rolls, dies, etc. Can be used in shaper or planer for surface grinding. Sizes: ¼ to 1 H.P.

D. BENCH GRINDER—Powerful—ball bearing equipped. For all kinds of grinding and general purpose buffing and polishing. Sizes: 6, 7, 8, 10, and 12 inches.

WRITE TODAY FOR COMPLETE DETAILS

WE MANUFACTURE

Tappers Routers Nut Setters Speed Lathes Screw Drivers Electric Drills Aerial Grinders Tool Post Grinders Abrasive Cut-Off Machines Bench and Pedestal Buffers

Air Master Dust Collectors Bench and Pedestal Grinders



TRADE

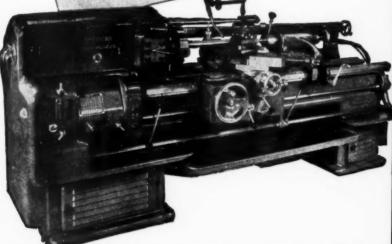
The Ancimatic

ECTRICAL TOOL CO.

Division of THE R. K. L.BLOND MACHINE TOOL CO.

2620 MADISON ROAD . CINCINNATI 8, OHIO





THE AMERICAN TOOL WORKS CO.





High Speed Precision Universal Milling Machine

for Profitable Tool Room and Laboratory Milling



Analysis of investment and time costs will prove that large milling machines are too ex pensive and slow for most tool room and lab oratory milling operations.

Hardinge Model UM High Speed Precision

Universal Milling Ma chines are designed to meet the definite need o tool room and laboratory for precision, ruggedness extreme accuracy and ease of operation.

Specifications

1" through collet capacity for both cutter and dividing head spindles, 11½" longitudinal, 13¼" vertical, 5½" transverse travel; power feed for table ½" to 13" per minute, 7" swing universal spiral dividing head; spiral leads from .600" to 42.656"; eight speeds from 110 to 1850 r.p.m.

Also available in TM Model with non-swiveling table and Universal Plain Dividing Head.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

